

# SEQUENCE LISTING

<110> Handfield, Martin  
Hillman, Jeffrey  
Progulske-Fox, Ann

<120> Identification of Actinobacillus actinomycetemcomitans Antigens for Use in the Diagnosis, Treatment, and Monitoring of Periodontal Diseases

<130> MBHB01-662

<140> To be assigned

<141> Filed herewith

<160> 234

<170> PatentIn version 3.0

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<213> Actinobacillus actinomycetemcomitans

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Pro Ile Lys Glu Thr Gly Thr Arg Leu Gly Glu Val Thr Ser Glu Val	
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Gly Asp Val Gln Leu Gly Cys Ile Gly Leu Gly Val Thr Glu Pro Ala	
85 90 95	

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ccg cag gcg gtg acc gac ccg gaa atg aat gta cgt att aac ccg cac	384
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145 150 155 160

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Gln Ala Ala Val Ile Gly Gly Thr Phe Trp Gln Gln Val Val Asn Leu  
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Pro Gln Ala Val Thr Asp Pro Glu Met Asn Val Arg Ile Asn Pro His  
115 120 125

Val Ile Pro Pro Leu Val Gln Ala Glu Ser Ile Ser Phe Phe Thr Arg  
 130 135 140

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 Asn Pro Arg Pro Ser Asn Asp Lys Ile Asn Gly Ala Thr Ile Asp Val  
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 Arg Leu Gly Asn Ser Phe Arg Val Phe Arg Glu His Ser Ala Pro Tyr  
 35 40 45

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 Val Met Ser Asp Glu Met Ile Ile Gly Asp Asp Glu Ala Phe Phe Leu  
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cat ccc ggc gtg ctg gcg ctt gcc acg act ttg gaa tca gta aaa ctg 288  
 His Pro Gly Val Leu Ala Leu Ala Thr Thr Leu Glu Ser Val Lys Leu  
 85 90 95

ccg gcg aat att atc ggt tgg ctg gac ggg cgt tct tct ttg gcg cgt 336  
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 100 105 110

ttg ggg ttg atg gta cac gtc acc gcc cat cgt atc gac cca ggc tgg 384

Leu Gly Leu Met Val His Val Thr Ala His Arg Ile Asp Pro Gly Trp  
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 145 150 155 160

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 35 40 45

Ile Asp Leu Ser Gly Pro Lys Glu Glu Val Ser Ala Gln Leu Glu Ser  
 50 55 60

Val Met Ser Asp Glu Met Ile Ile Gly Asp Asp Glu Ala Phe Phe Leu  
 65 70 75 80

His Pro Gly Val Leu Ala Leu Ala Thr Thr Leu Glu Ser Val Lys Leu  
 85 90 95

Pro Ala Asn Ile Ile Gly Trp Leu Asp Gly Arg Ser Ser Leu Ala Arg  
 100 105 110

Leu Gly Leu Met Val His Val Thr Ala His Arg Ile Asp Pro Gly Trp  
 115 120 125

Glu Gly Lys Ile Val Leu Glu Phe Tyr Asn Ser Gly Lys Leu Pro Leu  
 130 135 140

Ala Leu Arg Pro Asn Met Ile Ile Gly Ala Leu Ser Phe Glu Val Leu  
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 Arg Ser Lys Ile His Leu Ile Asp Gly Lys Leu Pro Phe Gly Asn Ala  
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acc gaa ctg ggt ttc gtc ggg ctt cat gct atg cgc atc ggc gaa tgg 144  
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 35 40 45

ctg gag caa ccg tta tat ttg gtg gaa acc caa ccg aac gac aac cgc 192  
 Leu Glu Gln Pro Leu Tyr Leu Val Glu Thr Gln Pro Asn Asp Asn Arg  
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acc tat ttt tct tta cgc gat caa ctg ccg ctg ccg caa gcg caa ttt 240  
 Thr Tyr Phe Ser Leu Arg Asp Gln Leu Pro Leu Pro Gln Ala Gln Phe  
 65 70 75 80

aat ctg ttg agc tgc ggc gtg gag tta aat cat ttc tat cag acc cat 288  
 Asn Leu Leu Ser Cys Gly Val Glu Leu Asn His Phe Tyr Gln Thr His  
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caa ttc tgc gga aag tgc ggt gga aaa acc gag caa atg cag gag gaa 336  
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Trp	Glu	Glu	Thr	Gln	Ile	Lys	Val	Lys	Asn	Leu	Arg	Tyr	Phe	Asp	Ser		
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		195					200					205					
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Tyr	Glu	Gly	Gly	Glu	Ile	Thr	Ile	Gln	Arg	Glu	Glu	Leu	Tyr	Asp	Ala		
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Gln	Trp	Phe	Asp	Cys	Asp	Gln	Pro	Leu	Pro	Glu	Leu	Pro	Pro	His	Gly		
	225				230					235					240		
acc	atc	gca	cgc	aaa	tta	att	gaa	acc	aca	ctt	gaa	ttg	tgt	aaa	cag		768
Thr	Ile	Ala	Arg	Lys	Leu	Ile	Glu	Thr	Thr	Leu	Glu	Leu	Cys	Lys	Gln		
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cat	aaa	ata	aac	cat	aat	aag	gaa	cgg	gca								798
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Thr	Glu	Leu	Gly	Phe	Val	Gly	Leu	His	Ala	Met	Arg	Ile	Gly	Glu	Trp		
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Thr Tyr Phe Ser Leu Arg Asp Gln Leu Pro Leu Pro Gln Ala Gln Phe  
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Asn Leu Leu Ser Cys Gly Val Glu Leu Asn His Phe Tyr Gln Thr His  
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Gln Phe Cys Gly Lys Cys Gly Gly Lys Thr Glu Gln Met Gln Glu Glu  
100 105 110

Trp Ala Val Lys Cys Arg Ala Cys Gly Phe His Thr Tyr Pro Val Ile  
115 120 125

Cys Pro Ser Ile Ile Val Ala Val Arg His Asp Ser Gln Ile Leu Leu  
130 135 140

Ala Asn His Met Arg His Lys Gly Gly Ile Tyr Thr Thr Leu Ala Gly  
145 150 155 160

Phe Val Glu Val Gly Glu Thr Phe Glu Asp Ala Val His Arg Glu Ile  
165 170 175

Trp Glu Glu Thr Gln Ile Lys Val Lys Asn Leu Arg Tyr Phe Asp Ser  
180 185 190

Gln Pro Trp Ala Phe Pro Asn Ser Gln Met Val Gly Phe Leu Ala Asp  
195 200 205

Tyr Glu Gly Gly Glu Ile Thr Ile Gln Arg Glu Glu Leu Tyr Asp Ala  
210 215 220

Gln Trp Phe Asp Cys Asp Gln Pro Leu Pro Glu Leu Pro Pro His Gly  
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 35 40 45  
  
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 gaa ttc ggc gtg cac caa gag ccg gtt ttt gcc gcg gtg atg aca ggg 240  
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 tta aaa tca aac gaa cag tgg agc gaa aaa gcc gta ccg gca gat ttt 288  
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 85 90 95  
  
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 100 105 110  
  
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 Gly Asn Arg Ala Lys Phe Val Ala Lys Ser Tyr Thr Ala Leu His Pro  
 115 120 125  
  
 ggt caa tct gcg gcc att atg ctg gat ggt gaa gaa atc gga ttt att 432  
 Gly Gln Ser Ala Ala Ile Met Leu Asp Gly Glu Glu Ile Gly Phe Ile  
 130 135 140  
  
 ggt caa ctt cac ccg act atc gcg caa aaa att ggt ctt acc gga aaa 480  
 Gly Gln Leu His Pro Thr Ile Ala Gln Lys Ile Gly Leu Thr Gly Lys  
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 Ala Phe Val Cys Glu Ile Ser Val Ala His Ile Ser Arg Arg Glu Val  
 165 170 175  
  
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 Ala Arg Ala Lys Glu Ile Ser Arg Phe Pro Ala Asn Arg Arg Asp Leu



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225	230	235	240
agc tta gta att caa gat aat gaa aaa acc ctt gaa gaa gat gaa att			768
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Leu Lys Ser Asn Glu Gln Trp Ser Glu Lys Ala Val Pro Ala Asp Phe			
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Ala	Phe	Val	Cys	Glu	Ile	Ser	Val	Ala	His	Ile	Ser	Arg	Arg	Glu	Val
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Ala	Arg	Ala	Lys	Glu	Ile	Ser	Arg	Phe	Pro	Ala	Asn	Arg	Arg	Asp	Leu
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Ser	Pro	Phe	Ala	Leu	Leu	Asp	Glu	Leu	Gln	Arg	Ile	Glu	Gln	Glu	Gln	
			20					25					30			
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 1 5 10 15

act atg cat att tcc gaa gat ggc gtg ata acc gat aaa acc gct caa 96  
 Thr Met His Ile Ser Glu Asp Gly Val Ile Thr Asp Lys Thr Ala Gln  
 20 25 30

cag ctt aat ccg gct agg tat gcc gga gct gtg tac aaa caa caa ttt 144  
 Gln Leu Asn Pro Ala Arg Tyr Ala Gly Ala Val Tyr Lys Gln Gln Phe  
 35 40 45

tct ttt tct gac agc ggc ggg caa ggt aaa acc act tac att aat caa 192  
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 50 55 60

aat aac ggc aag aaa ttc gat cct aaa aat gct gct gat gtg agt gaa 240  
 Asn Asn Gly Lys Lys Phe Asp Pro Lys Asn Ala Ala Asp Val Ser Glu  
 65 70 75 80

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 Leu Gly Lys Ser Ile Ala Phe Glu Val Phe Glu Ile Lys Glu Asn Lys  
 85 90 95

gac tct cac tca gta ttt gaa tcc ggc gcc ggc att tgt tac ggc ttc 336  
 Asp Ser His Ser Val Phe Glu Ser Gly Ala Gly Ile Cys Tyr Gly Phe  
 100 105 110

aaa tat acc gat ggc gtc gcg ttc acc gat tct aca acc tat tat gta	384
Lys Tyr Thr Asp Gly Val Ala Phe Thr Asp Ser Thr Thr Tyr Tyr Val	
115 120 125	

gat aaa tcc aag cag caa tat tac gcc agt atc atc ggc gcc acc gta	432
Asp Lys Ser Lys Gln Gln Tyr Tyr Ala Ser Ile Ile Gly Ala Thr Val	
130 135 140	

tct tct gac gtg gaa ccg aaa aac gtg caa tat gcg ccg gtg ttt aat	480
Ser Ser Asp Val Glu Pro Lys Asn Val Gln Tyr Ala Pro Val Phe Asn	
145 150 155 160	

att cag gat ccc gag tta gat aaa gaa gta aag tcg gaa gaa caa cga	528
Ile Gln Asp Pro Glu Leu Asp Lys Glu Val Lys Ser Glu Glu Gln Arg	
165 170 175	

aac ggt aaa acc ttg att aat aaa aat ttg caa aag agc aga gaa att	576
Asn Gly Lys Thr Leu Ile Asn Lys Asn Leu Gln Lys Ser Arg Glu Ile	
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Leu Ser Asn Val Val Cys Lys	
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35 40 45

Ser Phe Ser Asp Ser Gly Gly Gln Gly Lys Thr Thr Tyr Ile Asn Gln
50 55 60

Asn Asn Gly Lys Lys Phe Asp Pro Lys Asn Ala Ala Asp Val Ser Glu
65 70 75 80

Leu Gly Lys Ser Ile Ala Phe Glu Val Phe Glu Ile Lys Glu Asn Lys
85 90 95

Asp Ser His Ser Val Phe Glu Ser Gly Ala Gly Ile Cys Tyr Gly Phe  
 100 105 110

Lys Tyr Thr Asp Gly Val Ala Phe Thr Asp Ser Thr Thr Tyr Tyr Val  
 115 120 125

Asp Lys Ser Lys Gln Gln Tyr Tyr Ala Ser Ile Ile Gly Ala Thr Val  
 130 135 140

Ser Ser Asp Val Glu Pro Lys Asn Val Gln Tyr Ala Pro Val Phe Asn  
 145 150 155 160

Ile Gln Asp Pro Glu Leu Asp Lys Glu Val Lys Ser Glu Glu Gln Arg  
 165 170 175

Asn Gly Lys Thr Leu Ile Asn Lys Asn Leu Gln Lys Ser Arg Glu Ile  
 180 185 190

Leu Ser Asn Val Val Cys Lys  
 195

<210> 13  
 <211> 288  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1)..(288)

<400> 13  
 atg caa aaa ttg tta ctc gtc aca gtg att agt ggt gtt tta gtt gct 48  
 Met Gln Lys Leu Leu Leu Val Thr Val Ile Ser Gly Val Leu Val Ala  
 1 5 10 15

tgt tct tct aag gct cca caa atc aat caa gct cct tta gat aag cag 96  
 Cys Ser Ser Lys Ala Pro Gln Ile Asn Gln Ala Pro Leu Asp Lys Gln  
 20 25 30

aca gtt gaa gct tat caa gcg aaa gtg tat agc ggt aat acg gtg tcg 144  
 Thr Val Glu Ala Tyr Gln Ala Lys Val Tyr Ser Gly Asn Thr Val Ser  
 35 40 45

aag aaa tat caa gta aga gac gtt aaa ccg gaa gac aat gtg tta aat 192  
 Lys Lys Tyr Gln Val Arg Asp Val Lys Pro Glu Asp Asn Val Leu Asn  
 50 55 60

gct agt gat tcg gaa ccg aaa acc gtg att tat cgc gag cgt cag cca 240  
 Ala Ser Asp Ser Glu Pro Lys Thr Val Ile Tyr Arg Glu Arg Gln Pro  
 65 70 75 80

aga ctg gtt gtg aca ccg agc att ggc tat tat cgc ggt tgg cac tgg 288  
 Arg Leu Val Val Thr Pro Ser Ile Gly Tyr Tyr Arg Gly Trp His Trp  
                   85                  90                  95

<210> 14  
 <211> 96  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans  
 <400> 14

Met Gln Lys Leu Leu Leu Val Thr Val Ile Ser Gly Val Leu Val Ala  
 1                  5                  10                  15

Cys Ser Ser Lys Ala Pro Gln Ile Asn Gln Ala Pro Leu Asp Lys Gln  
                   20                  25                  30

Thr Val Glu Ala Tyr Gln Ala Lys Val Tyr Ser Gly Asn Thr Val Ser  
                   35                  40                  45

Lys Lys Tyr Gln Val Arg Asp Val Lys Pro Glu Asp Asn Val Leu Asn  
                   50                  55                  60

Ala Ser Asp Ser Glu Pro Lys Thr Val Ile Tyr Arg Glu Arg Gln Pro  
 65                  70                  75                  80

Arg Leu Val Val Thr Pro Ser Ile Gly Tyr Tyr Arg Gly Trp His Trp  
                   85                  90                  95

<210> 15  
 <211> 403  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans  
 <220>  
 <221> CDS  
 <222> (1)..(402)

<400> 15  
 cca aac tgg ttg cgc cgg caa gtc ggt gtc gtc ttg caa gat aat gtg 48  
 Pro Asn Trp Leu Arg Arg Gln Val Gly Val Val Leu Gln Asp Asn Val  
 1                  5                  10                  15

ttg ctt aat cga agt atc aga gag aat att gcg tta acc aat ccg gga 96  
 Leu Leu Asn Arg Ser Ile Arg Glu Asn Ile Ala Leu Thr Asn Pro Gly  
                   20                  25                  30

atg cca atg gaa aag gtt att gcc gcg gca aaa ctt gcg gga gcg cac 144  
 Met Pro Met Glu Lys Val Ile Ala Ala Ala Lys Leu Ala Gly Ala His

35	40	45	
gat ttt att tct gaa tta aga gaa ggt tat aac acg gtt gtg ggg gaa			192
Asp Phe Ile Ser Glu Leu Arg Glu Gly Tyr Asn Thr Val Val Gly Glu			
50	55	60	
cag gga gcc ggt ttg tcc gga gga caa cgt caa cgg atc gcg ata gca			240
Gln Gly Ala Gly Leu Ser Gly Gly Gln Arg Gln Arg Ile Ala Ile Ala			
65	70	75	80
agg gca cta gtc aat aac cca agg att ttg att ttt gat gaa gca acc			288
Arg Ala Leu Val Asn Asn Pro Arg Ile Leu Ile Phe Asp Glu Ala Thr			
85	90	95	
agt gca ctt gat tac gaa tct gaa aat atc att atg cat aat atg cat			336
Ser Ala Leu Asp Tyr Glu Ser Glu Asn Ile Ile Met His Asn Met His			
100	105	110	
aaa att tgc caa aat cgt act gtg ctt atc att gct cac cgc ctt tct			384
Lys Ile Cys Gln Asn Arg Thr Val Leu Ile Ile Ala His Arg Leu Ser			
115	120	125	
act gta aaa aat gct gat c			403
Thr Val Lys Asn Ala Asp			
130			

<210> 16  
 <211> 134  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans  
 <400> 16

Pro Asn Trp Leu Arg Arg Gln Val Gly Val Val Leu Gln Asp Asn Val			
1	5	10	15
Leu Leu Asn Arg Ser Ile Arg Glu Asn Ile Ala Leu Thr Asn Pro Gly			
20	25	30	
Met Pro Met Glu Lys Val Ile Ala Ala Ala Lys Leu Ala Gly Ala His			
35	40	45	
Asp Phe Ile Ser Glu Leu Arg Glu Gly Tyr Asn Thr Val Val Gly Glu			
50	55	60	
Gln Gly Ala Gly Leu Ser Gly Gly Gln Arg Gln Arg Ile Ala Ile Ala			
65	70	75	80
Arg Ala Leu Val Asn Asn Pro Arg Ile Leu Ile Phe Asp Glu Ala Thr			
85	90	95	

Ser Ala Leu Asp Tyr Glu Ser Glu Asn Ile Ile Met His Asn Met His  
 100 105 110

Lys Ile Cys Gln Asn Arg Thr Val Leu Ile Ile Ala His Arg Leu Ser  
 115 120 125

Thr Val Lys Asn Ala Asp  
 130

<210> 17  
 <211> 374  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans  
 <220>  
 <221> CDS  
 <222> (1) .. (372)

<400> 17  
 cac cgt tta ccg gaa atg att aac caa att cgc ggt ggc aaa agt gct 48  
 His Arg Leu Pro Glu Met Ile Asn Gln Ile Arg Gly Gly Lys Ser Ala  
 1 5 10 15

gtg gtg gat att agt ttc ccg gaa atc gaa aaa ttc gac cgg ttg ccg 96  
 Val Val Asp Ile Ser Phe Pro Glu Ile Glu Lys Phe Asp Arg Leu Pro  
 20 25 30

gaa ccg cgc gca gaa ggc ccg act gcc ttt gtt tct atc atg gaa ggc 144  
 Glu Pro Arg Ala Glu Gly Pro Thr Ala Phe Val Ser Ile Met Glu Gly  
 35 40 45

tgt aat aaa tac tgt act tac tgc gtg gtg cct tat acc cgt ggc gag 192  
 Cys Asn Lys Tyr Cys Thr Tyr Cys Val Val Pro Tyr Thr Arg Gly Glu  
 50 55 60

gaa gtt agc cgt ccg gtg gat gat att tta ttt gaa att gcc cag ttg 240  
 Glu Val Ser Arg Pro Val Asp Asp Ile Leu Phe Glu Ile Ala Gln Leu  
 65 70 75 80

gcg gag caa ggc gtg cgc gaa gtg aat ttg ctc ggc cag aac gtg aac 288  
 Ala Glu Gln Gly Val Arg Glu Val Asn Leu Leu Gly Gln Asn Val Asn  
 85 90 95

gcc tat cgt ggt ccg aca ttt gat ggc gat att tgc acc ttc gcc gaa 336  
 Ala Tyr Arg Gly Pro Thr Phe Asp Gly Asp Ile Cys Thr Phe Ala Glu  
 100 105 110

ttg ttg cgt ttg gta gcg gcc att gac ggt atc gat cg 374  
 Leu Leu Arg Leu Val Ala Ala Ile Asp Gly Ile Asp  
 115 120

<210> 18



<211> 124  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 18

His Arg Leu Pro Glu Met Ile Asn Gln Ile Arg Gly Gly Lys Ser Ala  
 1 5 10 15

Val Val Asp Ile Ser Phe Pro Glu Ile Glu Lys Phe Asp Arg Leu Pro  
 20 25 30

Glu Pro Arg Ala Glu Gly Pro Thr Ala Phe Val Ser Ile Met Glu Gly  
 35 40 45

Cys Asn Lys Tyr Cys Thr Tyr Cys Val Val Pro Tyr Thr Arg Gly Glu  
 50 55 60

Glu Val Ser Arg Pro Val Asp Asp Ile Leu Phe Glu Ile Ala Gln Leu  
 65 70 75 80

Ala Glu Gln Gly Val Arg Glu Val Asn Leu Leu Gly Gln Asn Val Asn  
 85 90 95

Ala Tyr Arg Gly Pro Thr Phe Asp Gly Asp Ile Cys Thr Phe Ala Glu  
 100 105 110

Leu Leu Arg Leu Val Ala Ala Ile Asp Gly Ile Asp  
 115 120

<210> 19  
 <211> 158  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1)..(156)

<400> 19

cta agc gta ttc aac tac gcc cat ttg ccg agc cgt ttt gcc gga cag 48  
 Leu Ser Val Phe Asn Tyr Ala His Leu Pro Ser Arg Phe Ala Gly Gln  
 1 5 10 15

gcg aaa atc aag gat tgg cag ttg ccg aaa ccg gaa gcg aaa ctg gaa 96  
 Ala Lys Ile Lys Asp Trp Gln Leu Pro Lys Pro Glu Ala Lys Leu Glu  
 20 25 30

att ctg caa aaa acc atc gaa acg ctg ggc aac gcc ggt tac aaa ttt 144

Ile Leu Gln Lys Thr Ile Glu Thr Leu Gly Asn Ala Gly Tyr Lys Phe  
 35 40 45

atc ggc atg gat ca  
 Ile Gly Met Asp  
 50

158

<210> 20  
 <211> 52  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 20

Leu Ser Val Phe Asn Tyr Ala His Leu Pro Ser Arg Phe Ala Gly Gln  
 1 5 10 15

Ala Lys Ile Lys Asp Trp Gln Leu Pro Lys Pro Glu Ala Lys Leu Glu  
 20 25 30

Ile Leu Gln Lys Thr Ile Glu Thr Leu Gly Asn Ala Gly Tyr Lys Phe  
 35 40 45

Ile Gly Met Asp  
 50

<210> 21  
 <211> 1098  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1)..(1095)

<400> 21

aat cag atg aat aaa acc tta aaa att tca ttg ttt gcc atg att tcc  
 Asn Gln Met Asn Lys Thr Leu Lys Ile Ser Leu Phe Ala Met Ile Ser  
 1 5 10 15 48

gcg tta gct ttt aat acc atg gca aat aca caa ccg tta gcc gtg ttg  
 Ala Leu Ala Phe Asn Thr Met Ala Asn Thr Gln Pro Leu Ala Val Leu  
 20 25 30 96

gaa ccg cag gta aac tat caa cag tta ctc acc caa ccg cag gtg gtg  
 Glu Pro Gln Val Asn Tyr Gln Gln Leu Leu Thr Gln Arg Gln Val Val  
 35 40 45 144

gat gat tta atc gcg cag gcg gtg aaa atc caa aat tca ccg gcg cgg  
 Asp Asp Leu Ile Ala Gln Ala Val Lys Ile Gln Asn Ser Pro Ala Arg  
 50 55 60 192



Lys His Ala Ser Leu Ile Ser Ser Gly Ser His Val Arg Arg Gly Gln  
 290 295 300  
 gcg ttg ttt gaa atc gcc gcc ttg gaa tcc ggt ccg caa aac atc aaa 960  
 Ala Leu Phe Glu Ile Ala Ala Leu Glu Ser Gly Pro Gln Asn Ile Lys  
 305 310 315 320  
 atc gaa acg gtg gcg gcg cta gac aaa ccg tta gac gaa tta caa aaa 1008  
 Ile Glu Thr Val Ala Ala Leu Asp Lys Pro Leu Asp Glu Leu Gln Lys  
 325 330 335  
 gtg agt gaa aaa gat tta ttg gga atc tat cgc gac agc ctg aaa acc 1056  
 Val Ser Glu Lys Asp Leu Leu Gly Ile Tyr Arg Asp Ser Leu Lys Thr  
 340 345 350  
 atg ggc ttg cca atg ttt aat agc gga gca cta caa gat taa 1098  
 Met Gly Leu Pro Met Phe Asn Ser Gly Ala Leu Gln Asp  
 355 360 365

<210> 22  
 <211> 365  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans  
 <400> 22

Asn Gln Met Asn Lys Thr Leu Lys Ile Ser Leu Phe Ala Met Ile Ser  
 1 5 10 15

Ala Leu Ala Phe Asn Thr Met Ala Asn Thr Gln Pro Leu Ala Val Leu  
 20 25 30

Glu Pro Gln Val Asn Tyr Gln Gln Leu Leu Thr Gln Arg Gln Val Val  
 35 40 45

Asp Asp Leu Ile Ala Gln Ala Val Lys Ile Gln Asn Ser Pro Ala Arg  
 50 55 60

Val Ser Asn Ala Gly Phe Thr Ala Lys Leu Pro Ser Asn Met Glu Arg  
 65 70 75 80

Ile Ala Ala Ile Leu Leu Glu Ala Tyr Glu Leu Glu Pro Tyr Arg Val  
 85 90 95

Asp Phe Leu Phe Gly Ala Ala Asn Ala Asn Ile Tyr Asn Gly Asn Thr  
 100 105 110

Asp Lys Ala Ile Glu Leu Tyr Gln Lys Val Leu Thr Val Ala Pro Asp  
 115 120 125

Asp Val Lys Ala His Ile Tyr Leu Thr Ala Trp Asn Arg Phe Lys Gln  
 130 135 140

Asn Gln Gly Glu Thr Asp Lys Tyr Phe Thr Arg Leu Lys Ala Leu Ala  
 145 150 155 160

Pro Gln Lys Ala Ala Glu Leu Glu Gln Val Phe Lys Ile Ile Asp Asn  
 165 170 175

Ala Ala Ser Gln Pro Ile Ser Asp Lys Leu Ala Asn Lys Leu Pro Ala  
 180 185 190

Asp Ser Ala Ile Ile Thr Leu Gly Tyr Ala Leu Asn Pro Asp Gly Ser  
 195 200 205

Met His Asp Ile Leu Ile Gln Arg Leu Glu Lys Thr Leu Glu Ile Ala  
 210 215 220

Lys Gln Asn Pro Asp Ala Leu Ile Ile Val Thr Gly Gly Met Pro Gln  
 225 230 235 240

Asn Asn Arg Thr Glu Gly Ala Leu Met Lys Gln Trp Leu Ile Asn Lys  
 245 250 255

Gly Ile Asp Ala Lys Arg Ile Tyr Ala Asp Asn Tyr Ala Arg Ser Thr  
 260 265 270

Val Glu Asn Ala Leu Phe Ser Arg Tyr Ala Leu Ala Lys His His Ile  
 275 280 285

Lys His Ala Ser Leu Ile Ser Ser Gly Ser His Val Arg Arg Gly Gln  
 290 295 300

Ala Leu Phe Glu Ile Ala Ala Leu Glu Ser Gly Pro Gln Asn Ile Lys  
 305 310 315 320

Ile Glu Thr Val Ala Ala Leu Asp Lys Pro Leu Asp Glu Leu Gln Lys  
 325 330 335

Val Ser Glu Lys Asp Leu Leu Gly Ile Tyr Arg Asp Ser Leu Lys Thr  
 340 345 350

Met Gly Leu Pro Met Phe Asn Ser Gly Ala Leu Gln Asp  
 355 360 365

<210> 23  
 <211> 134  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1)..(132)

<400> 23  
 ttg gat caa ttc ccg tcc gac gtt tat caa ggc ggc gcg ggc act tcc 48  
 Leu Asp Gln Phe Pro Ser Asp Val Tyr Gln Gly Gly Ala Gly Thr Ser  
 1 5 10 15  
 gtc aac atg aat acg aac gaa gtg gtt gcg aat ctg gca ttg gaa att 96  
 Val Asn Met Asn Thr Asn Glu Val Val Ala Asn Leu Ala Leu Glu Ile  
 20 25 30  
 tta gga cac aaa aaa ggc gaa tat aat tat ttg gat cc 134  
 Leu Gly His Lys Lys Gly Glu Tyr Asn Tyr Leu Asp  
 35 40

<210> 24  
 <211> 44  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 24  
 Leu Asp Gln Phe Pro Ser Asp Val Tyr Gln Gly Gly Ala Gly Thr Ser  
 1 5 10 15  
 Val Asn Met Asn Thr Asn Glu Val Val Ala Asn Leu Ala Leu Glu Ile  
 20 25 30  
 Leu Gly His Lys Lys Gly Glu Tyr Asn Tyr Leu Asp  
 35 40

<210> 25  
 <211> 380  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1)..(378)

<400> 25

gat ccg aac agc ttc aaa ctg cgc ggc gaa ttg agc cac ggc aaa gac	48
Asp Pro Asn Ser Phe Lys Leu Arg Gly Glu Leu Ser His Gly Lys Asp	
1 5 10 15	
gtg gaa atc gac atg aac gtg att tta aac ggc aaa gtg cgg tta gga	96
Val Glu Ile Asp Met Asn Val Ile Leu Asn Gly Lys Val Arg Leu Gly	
20 25 30	
aat cgg gtg aaa atc ggt gca ggt tgt gtg ttg act aac tgc gac atc	144
Asn Arg Val Lys Ile Gly Ala Gly Cys Val Leu Thr Asn Cys Asp Ile	
35 40 45	
ggc gat gac gtg gaa atc aaa ccg tat tcc gtg ctg gaa gat gcc tcc	192
Gly Asp Asp Val Glu Ile Lys Pro Tyr Ser Val Leu Glu Asp Ala Ser	
50 55 60	
gta ggc gcc aat gcc gcc atc gga ccg ttc tcc cgc tta cgt ccg ggc	240
Val Gly Ala Asn Ala Ala Ile Gly Pro Phe Ser Arg Leu Arg Pro Gly	
65 70 75 80	
gcc gac ttg gcg gaa aac acc cac gtg ggc aat ttc gtg gaa atc aaa	288
Ala Asp Leu Ala Glu Asn Thr His Val Gly Asn Phe Val Glu Ile Lys	
85 90 95	
aaa gcg tac atc ggc aaa ggc tcc aaa gtg aac cac tta acc tat gtg	336
Lys Ala Tyr Ile Gly Lys Gly Ser Lys Val Asn His Leu Thr Tyr Val	
100 105 110	
ggc gac gcg gaa atc ggc aaa gat tgt aac ata ggc gca ggc gt	380
Gly Asp Ala Glu Ile Gly Lys Asp Cys Asn Ile Gly Ala Gly	
115 120 125	
<210> 26	
<211> 126	
<212> PRT	
<213> Actinobacillus actinomycetemcomitans	
<400> 26	
Asp Pro Asn Ser Phe Lys Leu Arg Gly Glu Leu Ser His Gly Lys Asp	
1 5 10 15	
Val Glu Ile Asp Met Asn Val Ile Leu Asn Gly Lys Val Arg Leu Gly	
20 25 30	
Asn Arg Val Lys Ile Gly Ala Gly Cys Val Leu Thr Asn Cys Asp Ile	
35 40 45	
Gly Asp Asp Val Glu Ile Lys Pro Tyr Ser Val Leu Glu Asp Ala Ser	
50 55 60	
Val Gly Ala Asn Ala Ala Ile Gly Pro Phe Ser Arg Leu Arg Pro Gly	

65	70	75	80
Ala Asp Leu Ala Glu Asn Thr His Val Gly Asn Phe Val Glu Ile Lys			
	85	90	95
Lys Ala Tyr Ile Gly Lys Gly Ser Lys Val Asn His Leu Thr Tyr Val			
	100	105	110
Gly Asp Ala Glu Ile Gly Lys Asp Cys Asn Ile Gly Ala Gly			
	115	120	125

<210> 27  
 <211> 468  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1)..(468)

<400> 27	
att ggt cgc caa ctt gct cag ttg ctc aac atg gat ttt gta gat acc	48
Ile Gly Arg Gln Leu Ala Gln Leu Leu Asn Met Asp Phe Val Asp Thr	
1 5 10 15	
gac gca gaa att gaa gaa cgc gcc ggc gca gat att ggc tgg att ttt	96
Asp Ala Glu Ile Glu Glu Arg Ala Gly Ala Asp Ile Gly Trp Ile Phe	
20 25 30	
gat gtt gag ggc gaa gcc ggt ttc cgt aaa aga gaa gaa cgt att att	144
Asp Val Glu Gly Glu Ala Gly Phe Arg Lys Arg Glu Glu Arg Ile Ile	
35 40 45	
aac gaa tta acg caa cgc caa ggc atc gtg tta tct acc ggc ggc ggt	192
Asn Glu Leu Thr Gln Arg Gln Gly Ile Val Leu Ser Thr Gly Gly Gly	
50 55 60	
gca gtg tta tct aag gac aat cga aac cag ctt gcc gcg cgc ggt att	240
Ala Val Leu Ser Lys Asp Asn Arg Asn Gln Leu Ala Ala Arg Gly Ile	
65 70 75 80	
gtg att tat ctg gaa acc act gtt gaa aag caa tat caa cgc acc cag	288
Val Ile Tyr Leu Glu Thr Thr Val Glu Lys Gln Tyr Gln Arg Thr Gln	
85 90 95	
cgg gat aaa aag cgc ccg ctt ttg caa gat gtt gcc gat ccg cgt cag	336
Arg Asp Lys Lys Arg Pro Leu Leu Gln Asp Val Ala Asp Pro Arg Gln	
100 105 110	
gtg ttg gaa gat ttg gcg aaa atc cgc aat ccg ctg tat gaa gac gta	384
Val Leu Glu Asp Leu Ala Lys Ile Arg Asn Pro Leu Tyr Glu Asp Val	
115 120 125	



gca gac att acc ctc cct act gat gac caa agt gcc aag gta atg gca 432  
 Ala Asp Ile Thr Leu Pro Thr Asp Asp Gln Ser Ala Lys Val Met Ala  
 130 135 140

acg cag att atc gac ttg att gat aac tat aac ggt 468  
 Thr Gln Ile Ile Asp Leu Ile Asp Asn Tyr Asn Gly  
 145 150 155

<210> 28

<211> 156

<212> PRT

<213> Actinobacillus actinomycetemcomitans

<400> 28

Ile Gly Arg Gln Leu Ala Gln Leu Leu Asn Met Asp Phe Val Asp Thr  
 1 5 10 15

Asp Ala Glu Ile Glu Glu Arg Ala Gly Ala Asp Ile Gly Trp Ile Phe  
 20 25 30

Asp Val Glu Gly Glu Ala Gly Phe Arg Lys Arg Glu Glu Arg Ile Ile  
 35 40 45

Asn Glu Leu Thr Gln Arg Gln Gly Ile Val Leu Ser Thr Gly Gly Gly  
 50 55 60

Ala Val Leu Ser Lys Asp Asn Arg Asn Gln Leu Ala Ala Arg Gly Ile  
 65 70 75 80

Val Ile Tyr Leu Glu Thr Thr Val Glu Lys Gln Tyr Gln Arg Thr Gln  
 85 90 95

Arg Asp Lys Lys Arg Pro Leu Leu Gln Asp Val Ala Asp Pro Arg Gln  
 100 105 110

Val Leu Glu Asp Leu Ala Lys Ile Arg Asn Pro Leu Tyr Glu Asp Val  
 115 120 125

Ala Asp Ile Thr Leu Pro Thr Asp Asp Gln Ser Ala Lys Val Met Ala  
 130 135 140

Thr Gln Ile Ile Asp Leu Ile Asp Asn Tyr Asn Gly  
 145 150 155

<210> 29

<211> 307  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1)..(306)

<400> 29  
 gcc tcc cgc agt ggc gat gcc gat gag cgt gtc atg gat tcc aac gat 48  
 Ala Ser Arg Ser Gly Asp Ala Asp Glu Arg Val Met Asp Ser Asn Asp  
 1 5 10 15  
 tta gaa aaa gag cgc ggc atc act att tta gcg aaa aat act gcc att 96  
 Leu Glu Lys Glu Arg Gly Ile Thr Ile Leu Ala Lys Asn Thr Ala Ile  
 20 25 30  
 aac tgg aat agc tac cgt att aac att gta gac acc ccg ggg cac gcg 144  
 Asn Trp Asn Ser Tyr Arg Ile Asn Ile Val Asp Thr Pro Gly His Ala  
 35 40 45  
 gac ttc ggt ggc gaa gtg gaa cgc gta ctt tcc atg gtg gat tcc gta 192  
 Asp Phe Gly Gly Glu Val Glu Arg Val Leu Ser Met Val Asp Ser Val  
 50 55 60  
 tta ttg atg gtg gat gcc ttc gac ggc ccg atg ccg caa acc cgt ttt 240  
 Leu Leu Met Val Asp Ala Phe Asp Gly Pro Met Pro Gln Thr Arg Phe  
 65 70 75 80  
 gtt acg caa aaa gcc ttc tcc cac ggt tta aaa cct atc gta gtc atc 288  
 Val Thr Gln Lys Ala Phe Ser His Gly Leu Lys Pro Ile Val Val Ile  
 85 90 95  
 aat aaa gtt gac cgc ccg g 307  
 Asn Lys Val Asp Arg Pro  
 100

<210> 30  
 <211> 102  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 30  
 Ala Ser Arg Ser Gly Asp Ala Asp Glu Arg Val Met Asp Ser Asn Asp  
 1 5 10 15  
 Leu Glu Lys Glu Arg Gly Ile Thr Ile Leu Ala Lys Asn Thr Ala Ile  
 20 25 30  
 Asn Trp Asn Ser Tyr Arg Ile Asn Ile Val Asp Thr Pro Gly His Ala  
 35 40 45

Asp Phe Gly Gly Glu Val Glu Arg Val Leu Ser Met Val Asp Ser Val  
 50 55 60

Leu Leu Met Val Asp Ala Phe Asp Gly Pro Met Pro Gln Thr Arg Phe  
 65 70 75 80

Val Thr Gln Lys Ala Phe Ser His Gly Leu Lys Pro Ile Val Val Ile  
 85 90 95

Asn Lys Val Asp Arg Pro  
 100

<210> 31  
 <211> 891  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1)..(891)

<220>  
 <221> misc\_feature  
 <222> (182)..(182)  
 <223> n is any nucleotide a, g, c, or t.

<220>  
 <221> misc\_feature  
 <222> (188)..(188)  
 <223> n is any nucleotide a, g, c, or t.

<400> 31  
 atg gct atc gta caa tcc aaa tct gcc cgc tac cgt tta tgg gtg acc 48  
 Met Ala Ile Val Gln Ser Lys Ser Ala Arg Tyr Arg Leu Trp Val Thr  
 1 5 10 15

cat ttg ctg ctg att gca ttt att tgt ctg att att ttc ccg tta ctg 96  
 His Leu Leu Leu Ile Ala Phe Ile Cys Leu Ile Ile Phe Pro Leu Leu  
 20 25 30

atg gtg atc ggc att tcc ctg cgc ccg ggc aac ctc gct ttg ggc gat 144  
 Met Val Ile Gly Ile Ser Leu Arg Pro Gly Asn Leu Ala Leu Gly Asp  
 35 40 45

ttg att ccg aaa caa att tcc tgg gaa cac tgg cag gcg gcg ctt ggc 192  
 Leu Ile Pro Lys Gln Ile Ser Trp Glu His Trp Gln Ala Ala Leu Gly  
 50 55 60

ttt tat gtg gta cac gcc gac ggt tct gtc aca cca ccg ccg ttc ccg 240  
 Phe Tyr Val Val His Ala Asp Gly Ser Val Thr Pro Pro Pro Phe Pro  
 65 70 75 80

gtg ttg ttg tgg ttg tgg aac tcc att aaa gtg gcg acc atc acc tcc	288
Val Leu Leu Trp Leu Trp Asn Ser Ile Lys Val Ala Thr Ile Thr Ser	
85 90 95	
gtg ggt atc gtt gtt atg tcc acc act tgc gcc tac gct ttc gcg cgg	336
Val Gly Ile Val Val Met Ser Thr Thr Cys Ala Tyr Ala Phe Ala Arg	
100 105 110	
atg aaa ttc aaa ggc aaa aaa acc atc ttg caa ggc atg tta att ttc	384
Met Lys Phe Lys Gly Lys Lys Thr Ile Leu Gln Gly Met Leu Ile Phe	
115 120 125	
caa atg ttc cct gcg gtg ttg tct ttg gtc gcc tta tac gcc tta ttc	432
Gln Met Phe Pro Ala Val Leu Ser Leu Val Ala Leu Tyr Ala Leu Phe	
130 135 140	
gat cgc ctc ggt caa tat atc ccg ttc ctc ggc tta aac acc cac ggc	480
Asp Arg Leu Gly Gln Tyr Ile Pro Phe Leu Gly Leu Asn Thr His Gly	
145 150 155 160	
ggc gtg att ttc gct tac ttg ggc ggt atc gcc ttg cac gtt tgg acc	528
Gly Val Ile Phe Ala Tyr Leu Gly Gly Ile Ala Leu His Val Trp Thr	
165 170 175	
atc aaa ggc tat ttt gaa acc atc gac gga tcc ctg gaa gaa gct gcc	576
Ile Lys Gly Tyr Phe Glu Thr Ile Asp Gly Ser Leu Glu Glu Ala Ala	
180 185 190	
gcc tta gac ggc gct acc cca tgg cag gca ttc cgc tta att tta cta	624
Ala Leu Asp Gly Ala Thr Pro Trp Gln Ala Phe Arg Leu Ile Leu Leu	
195 200 205	
cct ctc tcc gta ccg att ctg gcg gtg gtc ttc att ctt tcc ttc atc	672
Pro Leu Ser Val Pro Ile Leu Ala Val Val Phe Ile Leu Ser Phe Ile	
210 215 220	
gcc gcc att acc gaa gtg ccg gtc gcc tcg cta tta tta cgc gat gtc	720
Ala Ala Ile Thr Glu Val Pro Val Ala Ser Leu Leu Leu Arg Asp Val	
225 230 235 240	
aac agc tac acc ctg gcg gtg gga atg caa caa tat ctc tac ccg caa	768
Asn Ser Tyr Thr Leu Ala Val Gly Met Gln Gln Tyr Leu Tyr Pro Gln	
245 250 255	
aac tac ctt tgg ggc gac ttc gcc gct gca gcg gtg ctt tcc gct att	816
Asn Tyr Leu Trp Gly Asp Phe Ala Ala Ala Val Leu Ser Ala Ile	
260 265 270	
cct att acc ctc gtg ttc tta ctg gca caa cgc tgg tta atc ggc gga	864
Pro Ile Thr Leu Val Phe Leu Leu Ala Gln Arg Trp Leu Ile Gly Gly	
275 280 285	
tta acg gca ggt ggg gtn aar ggn tga	891
Leu Thr Ala Gly Gly Val Lys Gly	
290 295	

<210> 32  
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 <222> (188)..(188)  
 <223> n is any nucleotide a, g, c, or t.

<400> 32

Met Ala Ile Val Gln Ser Lys Ser Ala Arg Tyr Arg Leu Trp Val Thr  
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His Leu Leu Leu Ile Ala Phe Ile Cys Leu Ile Ile Phe Pro Leu Leu  
 20 25 30

Met Val Ile Gly Ile Ser Leu Arg Pro Gly Asn Leu Ala Leu Gly Asp  
 35 40 45

Leu Ile Pro Lys Gln Ile Ser Trp Glu His Trp Gln Ala Ala Leu Gly  
 50 55 60

Phe Tyr Val Val His Ala Asp Gly Ser Val Thr Pro Pro Pro Phe Pro  
 65 70 75 80

Val Leu Leu Trp Leu Trp Asn Ser Ile Lys Val Ala Thr Ile Thr Ser  
 85 90 95

Val Gly Ile Val Val Met Ser Thr Thr Cys Ala Tyr Ala Phe Ala Arg  
 100 105 110

Met Lys Phe Lys Gly Lys Lys Thr Ile Leu Gln Gly Met Leu Ile Phe  
 115 120 125

Gln Met Phe Pro Ala Val Leu Ser Leu Val Ala Leu Tyr Ala Leu Phe  
 130 135 140

Asp Arg Leu Gly Gln Tyr Ile Pro Phe Leu Gly Leu Asn Thr His Gly  
 145 150 155 160

Gly Val Ile Phe Ala Tyr Leu Gly Gly Ile Ala Leu His Val Trp Thr  
165 170 175

Ile Lys Gly Tyr Phe Glu Thr Ile Asp Gly Ser Leu Glu Glu Ala Ala  
180 185 190

Ala Leu Asp Gly Ala Thr Pro Trp Gln Ala Phe Arg Leu Ile Leu Leu  
195 200 205

Pro Leu Ser Val Pro Ile Leu Ala Val Val Phe Ile Leu Ser Phe Ile  
210 215 220

Ala Ala Ile Thr Glu Val Pro Val Ala Ser Leu Leu Leu Arg Asp Val  
225 230 235 240

Asn Ser Tyr Thr Leu Ala Val Gly Met Gln Gln Tyr Leu Tyr Pro Gln  
245 250 255

Asn Tyr Leu Trp Gly Asp Phe Ala Ala Ala Val Leu Ser Ala Ile  
260 265 270

Pro Ile Thr Leu Val Phe Leu Leu Ala Gln Arg Trp Leu Ile Gly Gly  
275 280 285

Leu Thr Ala Gly Gly Val Lys Gly  
290 295

<210> 33  
<211> 323  
<212> DNA  
<213> Actinobacillus actinomycetemcomitans

<220>  
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<222> (1) .. (321)

<400> 33  
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Asn Val Tyr Gly Gly Thr Lys Ala Phe Val Lys Gln Phe Ser Leu Asn  
1 5 10 15

cta cgt gcc gat ctt gcc gga acc aat att cgc gtt tcc aat gta gaa 96  
Leu Arg Ala Asp Leu Ala Gly Thr Asn Ile Arg Val Ser Asn Val Glu  
20 25 30

cgc gga ctg tgc ggc ggc acg gaa ttt tct aac gta cgt ttt aaa ggc 144  
Pro Gly Leu Cys Gly Gly Thr Glu Phe Ser Asn Val Arg Phe Lys Gly

35	40	45	
gat aac gcc cgc gcg gaa aaa ctc tac gaa aac gta caa tat gtt acg			192
Asp Asn Ala Arg Ala Glu Lys Leu Tyr Glu Asn Val Gln Tyr Val Thr			
50	55	60	
cca caa gat att gcc aat atc gtg ttg tgg ctc aat caa caa ccg gaa			240
Pro Gln Asp Ile Ala Asn Ile Val Leu Trp Leu Asn Gln Gln Pro Glu			
65	70	75	80
cac gtc aac att aac cgc att gaa gtg atg ccg acg gcg caa acc ttc			288
His Val Asn Ile Asn Arg Ile Glu Val Met Pro Thr Ala Gln Thr Phe			
	85	90	95
gcc ccg ctt aat gta gca agg aat tta aat tta ga			323
Ala Pro Leu Asn Val Ala Arg Asn Leu Asn Leu			
	100	105	

<210> 34  
 <211> 107  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 34

Asn Val Tyr Gly Gly Thr Lys Ala Phe Val Lys Gln Phe Ser Leu Asn
1 5 10 15

Leu Arg Ala Asp Leu Ala Gly Thr Asn Ile Arg Val Ser Asn Val Glu
20 25 30

Pro Gly Leu Cys Gly Gly Thr Glu Phe Ser Asn Val Arg Phe Lys Gly
35 40 45

Asp Asn Ala Arg Ala Glu Lys Leu Tyr Glu Asn Val Gln Tyr Val Thr
50 55 60

Pro Gln Asp Ile Ala Asn Ile Val Leu Trp Leu Asn Gln Gln Pro Glu
65 70 75 80

His Val Asn Ile Asn Arg Ile Glu Val Met Pro Thr Ala Gln Thr Phe
85 90 95

Ala Pro Leu Asn Val Ala Arg Asn Leu Asn Leu
100 105

<210> 35  
 <211> 585  
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<213> Actinobacillus actinomycetemcomitans

<220>

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<222> (1)..(585)

<400> 35

atg gcg gaa acg att tta aac ccg tat ttc ggg gaa ttc ggc gga atg	48
Met Ala Glu Thr Ile Leu Asn Pro Tyr Phe Gly Glu Phe Gly Gly Met	
1 5 10 15	

tat gtg ccg gaa att cta gtg ccg gtg ttg caa cag ttg gaa aaa gcg	96
Tyr Val Pro Glu Ile Leu Val Pro Val Leu Gln Gln Leu Glu Lys Ala	
20 25 30	

ttt gta gaa gcc aag gcg gat cct gca ttt cag cgc gaa ttt cag gat	144
Phe Val Glu Ala Lys Ala Asp Pro Ala Phe Gln Arg Glu Phe Gln Asp	
35 40 45	

tta ttg aaa aat tat gcc ggc aga ccc acc gca ctt acc ctt tgt cgc	192
Leu Leu Lys Asn Tyr Ala Gly Arg Pro Thr Ala Leu Thr Leu Cys Arg	
50 55 60	

aat ctc acc aaa ggc acc aac gcc aaa atc tat tta aaa cgg gaa gat	240
Asn Leu Thr Lys Gly Thr Asn Ala Lys Ile Tyr Leu Lys Arg Glu Asp	
65 70 75 80	

tta tta cac ggc ggc gca cat aaa acc aac cag gta tta ggt cag att	288
Leu Leu His Gly Gly Ala His Lys Thr Asn Gln Val Leu Gly Gln Ile	
85 90 95	

ttg ctt gcc aaa cgc atg ggc aaa acc cgc att att gcc gaa acc ggc	336
Leu Leu Ala Lys Arg Met Gly Lys Thr Arg Ile Ile Ala Glu Thr Gly	
100 105 110	

gcg gga cag cac ggt gtc gcc act gct ctc gcc tgc gcc atg ttg gat	384
Ala Gly Gln His Gly Val Ala Thr Ala Leu Ala Cys Ala Met Leu Asp	
115 120 125	

atg ccg tgc cgt gtt tat atg ggc gcg aaa gat gtg gaa cgc caa tcg	432
Met Pro Cys Arg Val Tyr Met Gly Ala Lys Asp Val Glu Arg Gln Ser	
130 135 140	

ccg aat gtg ttt cgt atg cgt tta atg ggc acg gaa gtg gta ccg gtg	480
Pro Asn Val Phe Arg Met Arg Leu Met Gly Thr Glu Val Val Pro Val	
145 150 155 160	

caa aaa ggt tcc tgt tct ttg aaa gac gct tgc tgc gaa gcc atg cgt	528
Gln Lys Gly Ser Cys Ser Leu Lys Asp Ala Cys Cys Glu Ala Met Arg	
165 170 175	

gac tgg tcg gca aat tat gaa aat acg cac tat ttg ctc ggc aca gcg	576
Asp Trp Ser Ala Asn Tyr Glu Asn Thr His Tyr Leu Leu Gly Thr Ala	
180 185 190	

gca ggt ccg	585
Ala Gly Pro	



<210> 36  
 <211> 195  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 36

Met Ala Glu Thr Ile Leu Asn Pro Tyr Phe Gly Glu Phe Gly Gly Met  
 1 5 10 15

Tyr Val Pro Glu Ile Leu Val Pro Val Leu Gln Gln Leu Glu Lys Ala  
 20 25 30

Phe Val Glu Ala Lys Ala Asp Pro Ala Phe Gln Arg Glu Phe Gln Asp  
 35 40 45

Leu Leu Lys Asn Tyr Ala Gly Arg Pro Thr Ala Leu Thr Leu Cys Arg  
 50 55 60

Asn Leu Thr Lys Gly Thr Asn Ala Lys Ile Tyr Leu Lys Arg Glu Asp  
 65 70 75 80

Leu Leu His Gly Gly Ala His Lys Thr Asn Gln Val Leu Gly Gln Ile  
 85 90 95

Leu Leu Ala Lys Arg Met Gly Lys Thr Arg Ile Ile Ala Glu Thr Gly  
 100 105 110

Ala Gly Gln His Gly Val Ala Thr Ala Leu Ala Cys Ala Met Leu Asp  
 115 120 125

Met Pro Cys Arg Val Tyr Met Gly Ala Lys Asp Val Glu Arg Gln Ser  
 130 135 140

Pro Asn Val Phe Arg Met Arg Leu Met Gly Thr Glu Val Val Pro Val  
 145 150 155 160

Gln Lys Gly Ser Cys Ser Leu Lys Asp Ala Cys Cys Glu Ala Met Arg  
 165 170 175

Asp Trp Ser Ala Asn Tyr Glu Asn Thr His Tyr Leu Leu Gly Thr Ala  
 180 185 190

Ala Gly Pro  
195

<210> 37  
<211> 543  
<212> DNA  
<213> Actinobacillus actinomycetemcomitans

<220>  
<221> CDS  
<222> (1)..(543)

<400> 37  
atg tcg cac gta ttt caa atc tca aga gaa att atg aca gct tta aat 48  
Met Ser His Val Phe Gln Ile Ser Arg Glu Ile Met Thr Ala Leu Asn  
1 5 10 15  
  
gta ctt att tac ccg gaa gag cac ctt aaa gtg gtt tgc gat ccg gtc 96  
Val Leu Ile Tyr Pro Glu Glu His Leu Lys Val Val Cys Asp Pro Val  
20 25 30  
  
gtg gaa gtc aat gac aac acg cgt aag att att gat aat atg ttt gat 144  
Val Glu Val Asn Asp Asn Thr Arg Lys Ile Ile Asp Asn Met Phe Asp  
35 40 45  
  
acc atg tat cag gaa ggc ggt atc ggc cta gcg gca ccg cag gtg gat 192  
Thr Met Tyr Gln Glu Gly Gly Ile Gly Leu Ala Ala Pro Gln Val Asp  
50 55 60  
  
att tta cag cgt att atc act att gat att gag ggt gac aaa caa aac 240  
Ile Leu Gln Arg Ile Ile Thr Ile Asp Ile Glu Gly Asp Lys Gln Asn  
65 70 75 80  
  
cag tta gtg ttg att aac cct gaa att ttg gaa tcg gaa ggt gaa acc 288  
Gln Leu Val Leu Ile Asn Pro Glu Ile Leu Glu Ser Glu Gly Glu Thr  
85 90 95  
  
gga att gaa gag ggt tgt ttg tcg att ccc gga ttt cgt gcg tta gtg 336  
Gly Ile Glu Glu Gly Cys Leu Ser Ile Pro Gly Phe Arg Ala Leu Val  
100 105 110  
  
cca cgt aaa gag aaa gtg act gta aaa gcg ctg gat cgt cat ggt aaa 384  
Pro Arg Lys Glu Lys Val Thr Val Lys Ala Leu Asp Arg His Gly Lys  
115 120 125  
  
gaa ttc acc tta aaa gcc gat ggt ctg ttg gca att tgt att cag cat 432  
Glu Phe Thr Leu Lys Ala Asp Gly Leu Leu Ala Ile Cys Ile Gln His  
130 135 140  
  
gaa att gat cat tta aac ggt att ctt ttt gtg gat tat ctc tct cca 480  
Glu Ile Asp His Leu Asn Gly Ile Leu Phe Val Asp Tyr Leu Ser Pro  
145 150 155 160  
  
ttg aaa cgt cag cgg att aaa gaa aag ctg att aaa atg aaa aag cag 528  
Leu Lys Arg Gln Arg Ile Lys Glu Lys Leu Ile Lys Met Lys Lys Gln

165 170 175  
 atg gaa aag caa aaa 543  
 Met Glu Lys Gln Lys  
 180  
  
 <210> 38  
 <211> 181  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans  
  
 <400> 38  
  
 Met Ser His Val Phe Gln Ile Ser Arg Glu Ile Met Thr Ala Leu Asn  
 1 5 10 15  
  
 Val Leu Ile Tyr Pro Glu Glu His Leu Lys Val Val Cys Asp Pro Val  
 20 25 30  
  
 Val Glu Val Asn Asp Asn Thr Arg Lys Ile Ile Asp Asn Met Phe Asp  
 35 40 45  
  
 Thr Met Tyr Gln Glu Gly Gly Ile Gly Leu Ala Ala Pro Gln Val Asp  
 50 55 60  
  
 Ile Leu Gln Arg Ile Ile Thr Ile Asp Ile Glu Gly Asp Lys Gln Asn  
 65 70 75 80  
  
 Gln Leu Val Leu Ile Asn Pro Glu Ile Leu Glu Ser Glu Gly Glu Thr  
 85 90 95  
  
 Gly Ile Glu Glu Gly Cys Leu Ser Ile Pro Gly Phe Arg Ala Leu Val  
 100 105 110  
  
 Pro Arg Lys Glu Lys Val Thr Val Lys Ala Leu Asp Arg His Gly Lys  
 115 120 125  
  
 Glu Phe Thr Leu Lys Ala Asp Gly Leu Leu Ala Ile Cys Ile Gln His  
 130 135 140  
  
 Glu Ile Asp His Leu Asn Gly Ile Leu Phe Val Asp Tyr Leu Ser Pro  
 145 150 155 160  
  
 Leu Lys Arg Gln Arg Ile Lys Glu Lys Leu Ile Lys Met Lys Lys Gln  
 165 170 175

Met Glu Lys Gln Lys  
180

<210> 39  
<211> 353  
<212> DNA  
<213> Actinobacillus actinomycetemcomitans

<220>  
<221> CDS  
<222> (1)..(351)

<400> 39  
cgc ggc gtg aca ccg gaa cta ttc gcc gac tgg tta aaa cag tta cat 48  
Arg Gly Val Thr Pro Glu Leu Phe Ala Asp Trp Leu Lys Gln Leu His  
1 5 10 15  
  
cag gcg ggc gta aaa gtg gtg ttg gac agc agt aac gcc gca ttg acc 96  
Gln Ala Gly Val Lys Val Val Leu Asp Ser Ser Asn Ala Ala Leu Thr  
20 25 30  
  
gcc ggc tta acg gcg caa cct tgg ttg gtt aaa ccg aat cat cgt gag 144  
Ala Gly Leu Thr Ala Gln Pro Trp Leu Val Lys Pro Asn His Arg Glu  
35 40 45  
  
ttg gaa gcc tgg att ggt cat gcg ctg ccg acc ttg gac gac att atc 192  
Leu Glu Ala Trp Ile Gly His Ala Leu Pro Thr Leu Asp Asp Ile Ile  
50 55 60  
  
gcg gcg gcg aaa aaa ctg aaa gca caa ggc att gct aac gtg att att 240  
Ala Ala Ala Lys Lys Leu Lys Ala Gln Gly Ile Ala Asn Val Ile Ile  
65 70 75 80  
  
tcc atg ggc gcc aac ggt tcg ttg tgg ttg agc gat aca gcc gtc gta 288  
Ser Met Gly Ala Asn Gly Ser Leu Trp Leu Ser Asp Thr Ala Val Val  
85 90 95  
  
cag gcg caa ccg ccg aaa tgc gaa aac gtg gtc agc acc gtg ggc gcg 336  
Gln Ala Gln Pro Pro Lys Cys Glu Asn Val Val Ser Thr Val Gly Ala  
100 105 110  
  
ggc gat tct atg gtg gc 353  
Gly Asp Ser Met Val  
115

<210> 40  
<211> 117  
<212> PRT  
<213> Actinobacillus actinomycetemcomitans

<400> 40

Arg Gly Val Thr Pro Glu Leu Phe Ala Asp Trp Leu Lys Gln Leu His  
1 5 10 15

Gln Ala Gly Val Lys Val Val Leu Asp Ser Ser Asn Ala Ala Leu Thr  
 20 25 30

Ala Gly Leu Thr Ala Gln Pro Trp Leu Val Lys Pro Asn His Arg Glu  
 35 40 45

Leu Glu Ala Trp Ile Gly His Ala Leu Pro Thr Leu Asp Asp Ile Ile  
 50 55 60

Ala Ala Ala Lys Lys Leu Lys Ala Gln Gly Ile Ala Asn Val Ile Ile  
 65 70 75 80

Ser Met Gly Ala Asn Gly Ser Leu Trp Leu Ser Asp Thr Ala Val Val  
 85 90 95

Gln Ala Gln Pro Pro Lys Cys Glu Asn Val Val Ser Thr Val Gly Ala  
 100 105 110

Gly Asp Ser Met Val  
 115

<210> 41  
 <211> 367  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
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 <222> (1)..(366)

<400> 41  
 atg aaa aaa tgg ttt atg ctg tta ctt ccg ctg aca ttt atc ggc agc 48  
 Met Lys Lys Trp Phe Met Leu Leu Leu Pro Leu Thr Phe Ile Gly Ser  
 1 5 10 15

ctt tgg gcg cag gaa gcg cct tcc ccc ttt ctt gcc ggg gaa tta ccg 96  
 Leu Trp Ala Gln Glu Ala Pro Ser Pro Phe Leu Ala Gly Glu Leu Pro  
 20 25 30

gca gcg caa aaa atc gaa aaa gtc tta agc gcc ggt aat ccg agt gat 144  
 Ala Ala Gln Lys Ile Glu Lys Val Leu Ser Ala Gly Asn Pro Ser Asp  
 35 40 45

gcg tta ttg ctg gcc gcc gcg ccg caa aaa atg gtc gga ctg gcg ggc 192  
 Ala Leu Leu Leu Ala Ala Ala Pro Gln Lys Met Val Gly Leu Ala Gly  
 50 55 60

ttt aag atg gca tcc aaa ggc ggc aaa tta ttt cct gtg caa caa caa 240

Phe Lys Met Ala Ser Lys Gly Gly Lys Leu Phe Pro Val Gln Gln Gln  
 65 70 75 80  
 gcg ttg ccg acc atc ggc aaa att gcc gga aag ggc agt acg ttt tcc 288  
 Ala Leu Pro Thr Ile Gly Lys Ile Ala Gly Lys Gly Ser Thr Phe Ser  
 85 90 95  
 gcc gaa aaa atc gtg gcg ctt caa ccg aat ttg att att gat gtg ggc 336  
 Ala Glu Lys Ile Val Ala Leu Gln Pro Asn Leu Ile Ile Asp Val Gly  
 100 105 110  
 aat gtg gcg ccg aat tac atc gat cag gca a 367  
 Asn Val Ala Pro Asn Tyr Ile Asp Gln Ala  
 115 120

<210> 42  
 <211> 122  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 42

Met Lys Lys Trp Phe Met Leu Leu Leu Pro Leu Thr Phe Ile Gly Ser  
 1 5 10 15

Leu Trp Ala Gln Glu Ala Pro Ser Pro Phe Leu Ala Gly Glu Leu Pro  
 20 25 30

Ala Ala Gln Lys Ile Glu Lys Val Leu Ser Ala Gly Asn Pro Ser Asp  
 35 40 45

Ala Leu Leu Leu Ala Ala Ala Pro Gln Lys Met Val Gly Leu Ala Gly  
 50 55 60

Phe Lys Met Ala Ser Lys Gly Gly Lys Leu Phe Pro Val Gln Gln Gln  
 65 70 75 80

Ala Leu Pro Thr Ile Gly Lys Ile Ala Gly Lys Gly Ser Thr Phe Ser  
 85 90 95

Ala Glu Lys Ile Val Ala Leu Gln Pro Asn Leu Ile Ile Asp Val Gly  
 100 105 110

Asn Val Ala Pro Asn Tyr Ile Asp Gln Ala  
 115 120

<210> 43  
 <211> 4593

<212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1)..(4593)

<400> 43

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Val	Phe	Lys	Val	Ile	Trp	Cys	Lys	Thr	Ser	Gln	Thr	Trp	Ile	Ala	Val	
1				5					10					15		

tct	gaa	cta	tct	aaa	gct	ttt	tcc	ctt	tct	acc	act	aca	gat	ata	cct	96
Ser	Glu	Leu	Ser	Lys	Ala	Phe	Ser	Leu	Ser	Thr	Thr	Thr	Asp	Ile	Pro	
			20					25					30			

aaa	aaa	act	aaa	ata	ttc	att	gct	gca	gcc	ccg	tta	tta	ttt	ctc	tcc	144
Lys	Lys	Thr	Lys	Ile	Phe	Ile	Ala	Ala	Ala	Pro	Leu	Leu	Phe	Leu	Ser	
		35					40					45				

ttt	aat	acc	aac	gct	tac	att	gct	ata	ggg	tct	gtt	gaa	aac	aat	tct	192
Phe	Asn	Thr	Asn	Ala	Tyr	Ile	Ala	Ile	Gly	Ser	Val	Glu	Asn	Asn	Ser	
	50					55					60					

gtg	aaa	tcc	gag	ggg	gca	gaa	gcc	tcc	cca	aac	aag	aga	aag	gga	agc	240
Val	Lys	Ser	Glu	Gly	Ala	Glu	Ala	Ser	Pro	Asn	Lys	Arg	Lys	Gly	Ser	
65					70				75					80		

caa	gca	tta	aat	tat	tac	aac	ccc	ggg	agt	aaa	tca	tat	gat	gat	aaa	288
Gln	Ala	Leu	Asn	Tyr	Tyr	Asn	Pro	Gly	Ser	Lys	Ser	Tyr	Asp	Asp	Lys	
			85					90					95			

gac	aaa	ccg	agc	aat	cct	gaa	aga	aga	tac	agc	aat	ggg	gag	gca	tat	336
Asp	Lys	Pro	Ser	Asn	Pro	Glu	Arg	Arg	Tyr	Ser	Asn	Gly	Glu	Ala	Tyr	
		100						105					110			

ggg	atc	gct	atc	ggg	aaa	aat	acc	gat	gtt	cgt	gac	tca	agt	aag	gat	384
Gly	Ile	Ala	Ile	Gly	Lys	Asn	Thr	Asp	Val	Arg	Asp	Ser	Ser	Lys	Asp	
		115					120					125				

tca	aat	ggg	atc	gcc	tta	ggc	gat	tat	tct	aaa	gct	acc	ggg	ggg	ctt	432
Ser	Asn	Gly	Ile	Ala	Leu	Gly	Asp	Tyr	Ser	Lys	Ala	Thr	Gly	Gly	Leu	
	130					135					140					

gcc	atg	gcc	tta	ggg	tca	ttt	tcc	aga	gca	gaa	aaa	aat	ggc	ggg	att	480
Ala	Met	Ala	Leu	Gly	Ser	Phe	Ser	Arg	Ala	Glu	Lys	Asn	Gly	Gly	Ile	
145				150						155					160	

gca	atc	ggg	ata	gct	tcc	aga	tca	tca	gga	att	aat	tct	ctt	gcg	atg	528
Ala	Ile	Gly	Ile	Ala	Ser	Arg	Ser	Ser	Gly	Ile	Asn	Ser	Leu	Ala	Met	
			165					170					175			

atg	cgt	caa	tct	gca	gca	acc	ggg	gat	tat	tct	act	gcc	att	ggg	tct	576
Met	Arg	Gln	Ser	Ala	Ala	Thr	Gly	Asp	Tyr	Ser	Thr	Ala	Ile	Gly	Ser	
		180					185						190			

gtc	gca	tgg	gct	gca	ggg	caa	tca	agc	ttc	gca	ctg	ggg	gct	tct	gct	624
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Val	Ala	Trp	Ala	Ala	Gly	Gln	Ser	Ser	Phe	Ala	Leu	Gly	Ala	Ser	Ala		
	195						200					205					
act	gct	aaa	ggc	aac	caa	tcc	att	gca	att	ggc	agc	ttg	gaa	caa	aaa	672	
Thr	Ala	Lys	Gly	Asn	Gln	Ser	Ile	Ala	Ile	Gly	Ser	Leu	Glu	Gln	Lys		
	210					215					220						
ata	tct	ccg	aat	ggg	tct	ggg	gtg	cca	atc	aca	aaa	tac	aac	ggg	tta	720	
Ile	Ser	Pro	Asn	Gly	Ser	Gly	Val	Pro	Ile	Thr	Lys	Tyr	Asn	Gly	Leu		
	225				230					235					240		
gac	aac	aca	caa	acc	aat	ggg	aac	cgt	tcc	atg	gca	ttg	ggg	acg	gca	768	
Asp	Asn	Thr	Gln	Thr	Asn	Gly	Asn	Arg	Ser	Met	Ala	Leu	Gly	Thr	Ala		
				245					250					255			
gct	aaa	acc	aat	ggg	gat	gat	tca	ttt	gct	att	ggg	tat	aaa	gca	cac	816	
Ala	Lys	Thr	Asn	Gly	Asp	Asp	Ser	Phe	Ala	Ile	Gly	Tyr	Lys	Ala	His		
			260				265						270				
acc	ggg	gag	ttt	aaa	gtg	gaa	cat	gac	aac	tat	cta	aaa	gag	aat	gtt	864	
Thr	Gly	Glu	Phe	Lys	Val	Glu	His	Asp	Asn	Tyr	Leu	Lys	Glu	Asn	Val		
		275					280					285					
acc	tct	ccg	gat	ctg	tct	aaa	aaa	gct	gat	aaa	gcc	att	gct	gtc	ggg	912	
Thr	Ser	Pro	Asp	Leu	Ser	Lys	Lys	Ala	Asp	Lys	Ala	Ile	Ala	Val	Gly		
	290					295					300						
acg	agt	gcc	ctt	gcg	caa	aaa	gaa	tct	gct	atc	gca	ttt	ggc	tac	caa	960	
Thr	Ser	Ala	Leu	Ala	Gln	Lys	Glu	Ser	Ala	Ile	Ala	Phe	Gly	Tyr	Gln		
	305				310					315					320		
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Val	Ala	Val	Ala	Asn	Ala	Gly	Lys	Glu	Arg	Arg	Ile	Ile	Asn	Val	Ala		
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Gly	Gly	Arg	Asn	Asp	Thr	Asp	Ala	Val	Asn	Ile	Ala	Gln	Leu	Lys	Phe		



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Ser	Asn	Val	Ser	Gly	Gln	Asn	Thr	Val	Ala	Leu	Gly	Ala	Asn	Ile	Thr															
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gcg	aca	acc	aac	ggt	tcc	gtc	att	tta	gga	aat	tcc	tcc	acc	acg	gaa	1680														
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Gly	Ser	His	Pro	Val	Ser	Asn	Val	Ser	Ser	Ala	Thr	Val	Asn	Gly	Tyr															
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Phe	Ala	Val	Ala	Ser	Arg	Val	Glu	Gln	Gly	Trp	Gln	Ile	Thr	Ser	Gly															
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Ile Val Glu Lys Lys Ala Ala Gln Ala Gly Asp Glu Asn Leu Ala Asp	
755 760 765	
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Ile Ser Val Ala Asn Gly Lys Asn Ala Gly Asp Met Gly Ala Lys Tyr	
770 775 780	
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Glu Val Ser Val Ser Lys Lys Ala Val Gln Ser Ala Ala Lys Glu Ala	
785 790 795 800	
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Gln Leu	Ser Ile Val Asp	Lys	Lys Phe Asp Asn Lys	Val Ser Leu	
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Val Thr	Thr Ser Gly Ser	Gly	Asp Asp Val Thr Val	Asp Leu Ala	
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Ala Val	Val Lys Ala Ala	Asp	Ser Thr Ile Thr Val	Thr Asp Glu	
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acc gat	aat acg aca gga	caa	aaa acc tac aaa atc	aaa gcc aat	3699
Thr Asp	Asn Thr Thr Gly	Gln	Lys Thr Tyr Lys Ile	Lys Ala Asn	
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Ile Pro	Thr Pro Glu Lys	Thr	Ala Met Ala Pro Gly	Asn Asn Thr	
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Thr Ile	Glu Gly Asp Gly	Ser	Ala Ala Asn Pro Phe	Lys Val Asn	
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Leu Lys	Asp Asp Leu Ala	Leu	Gly Gln Lys Asp Ala	Asn Gly Val	
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Thr Gly	Lys Asp Ser Ser	Ile	Lys Val Asn Gly Lys	Asp Gly Ser	
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Lys Asp	Gly Ala Asn Pro	Val	Thr Ile Lys Thr Ala	Gln Gly Pro	

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Lys Lys Thr Lys Ile Phe Ile Ala Ala Ala Pro Leu Leu Phe Leu Ser  
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Phe Asn Thr Asn Ala Tyr Ile Ala Ile Gly Ser Val Glu Asn Asn Ser  
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Val Lys Ser Glu Gly Ala Glu Ala Ser Pro Asn Lys Arg Lys Gly Ser  
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Gln Ala Leu Asn Tyr Tyr Asn Pro Gly Ser Lys Ser Tyr Asp Asp Lys  
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Asp Lys Pro Ser Asn Pro Glu Arg Arg Tyr Ser Asn Gly Glu Ala Tyr  
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Gly Ile Ala Ile Gly Lys Asn Thr Asp Val Arg Asp Ser Ser Lys Asp  
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Met Arg Gln Ser Ala Ala Thr Gly Asp Tyr Ser Thr Ala Ile Gly Ser  
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Val Ala Trp Ala Ala Gly Gln Ser Ser Phe Ala Leu Gly Ala Ser Ala  
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Thr Ala Lys Gly Asn Gln Ser Ile Ala Ile Gly Ser Leu Glu Gln Lys  
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Ile Ser Pro Asn Gly Ser Gly Val Pro Ile Thr Lys Tyr Asn Gly Leu  
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Asp Asn Thr Gln Thr Asn Gly Asn Arg Ser Met Ala Leu Gly Thr Ala  
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Ala Ser Gln Asp Asn Val Val Ala Ile Gly Lys Tyr Ala Thr Ala Thr  
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Gly Gln Ser Lys Phe Thr Ala Gln Asn Tyr Asp Ala Asn Asn Gly Val  
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Val Ala Val Ala Asn Ala Gly Lys Glu Arg Arg Ile Ile Asn Val Ala  
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Gly Gly Arg Asn Asp Thr Asp Ala Val Asn Ile Ala Gln Leu Lys Phe

420

425

430

Val Asn Asp Asn Leu Ala Lys Ser Ile Ala Gly Ala Gly Tyr Asn Gly  
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Tyr Glu Thr Asp Gly His Thr Tyr Lys Ala Pro Val Phe Ser Ile Lys  
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Asn Tyr Val Ser Val Asn Ser Thr Asn Thr Ala Ala Asp Ser Asn Tyr  
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Asp Asn Lys Gly Ala Lys Ala Val Gly Ser Ile Ala Leu Gly Glu Lys  
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Val Glu Asn Gly Gly Thr Gln Asn Gly Ala Ala Ser Thr Ala Thr Ile  
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Lys Pro Ser Asn Gln Val Lys Leu Leu Ala Gly Lys Asn Leu Ala Val  
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675 680 685

Phe Thr Asn Val Thr Thr Gln Asp Leu Thr Ala Thr Gly Asn Thr Thr  
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Val Lys Asn Phe Ser Val Gln Asn Gly Gly Thr Ile Asn Met Gly Asn  
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Ile Val Glu Lys Lys Ala Ala Gln Ala Gly Asp Glu Asn Leu Ala Asp  
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885 890 895

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Ser Lys Ser Asp Gly Glu Val Val Ser Asn Ala Ser Asn Ser Val Lys  
930 935 940

Asn Gly Asp Thr Val Thr Tyr Asp Ala Gly Lys Asn Ile Lys Ile Thr  
945 950 955 960

Gln Arg Asp Lys Lys Phe Ser Phe Ala Thr Lys Asp Asn Val Glu Phe  
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Thr Ser Val Thr Thr Gly Asn Thr Lys Leu Thr Gly Asn Gly Val Glu  
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Ile Thr Asn Gly Pro Lys Leu Thr Gln Ser Gly Val Asp Ala Gly Gly  
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Asn Pro Ser Leu Thr Val Gly Pro Arg Thr Asn Gly His Pro Ile  
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Thr Ile Asp Gly Asn Asn Gly Tyr Ile Thr Gly Leu Thr Asn Thr  
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Ser Trp	Thr Gly Ala Pro	Thr	Thr Gly Arg Ala Ala	Thr Glu Asp
1100		1105		1110
Gln Leu	Ser Ile Val Asp	Lys	Lys Phe Asp Asn Lys	Val Ser Leu
1115		1120		1125
Gly Gly	Asp Asn Gly Ser	Thr	Thr Glu Lys Ser	Leu Ser His Asn
1130		1135		1140
Gly Gly	Ile Lys Phe Asn	Ile	Lys Gly Gly Asp	Ser Gln Lys Tyr
1145		1150		1155
Val Thr	Thr Ser Gly Ser	Gly	Asp Asp Val Thr	Val Asp Leu Ala
1160		1165		1170
Gln Thr	Thr Lys Asn Lys	Ile	Asp Asn Ala Ala	Asp Lys Asp Leu
1175		1180		1185
Ala Asn	Ile Thr Asp Asn	Gly	Lys Lys Val Ile	Thr Ala Leu Gly
1190		1195		1200
Ala Val	Val Lys Ala Ala	Asp	Ser Thr Ile Thr	Val Thr Asp Glu
1205		1210		1215
Thr Asp	Asn Thr Thr Gly	Gln	Lys Thr Tyr Lys	Ile Lys Ala Asn
1220		1225		1230
Ile Pro	Thr Pro Glu Lys	Thr	Ala Met Ala Pro	Gly Asn Asn Thr
1235		1240		1245
Thr Ile	Glu Gly Asp Gly	Ser	Ala Ala Asn Pro	Phe Lys Val Asn
1250		1255		1260
Leu Lys	Asp Asp Leu Ala	Leu	Gly Gln Lys Asp	Ala Asn Gly Val
1265		1270		1275
Thr Gly	Lys Asp Ser Ser	Ile	Lys Val Asn Gly	Lys Asp Gly Ser
1280		1285		1290
Gly Val	Ala Ile Asn Gly	Lys	Asp Gly Ser Ile	Ala Leu Asn Gly
1295		1300		1305
Lys Asp	Gly Ala Asn Pro	Val	Thr Ile Lys Thr	Ala Gln Gly Pro

1310		1315		1320
Ala Gly Val Asn Glu Thr Asn Pro Lys Asp Arg Leu Met Val Asn				
1325		1330		1335
Asn Asp Ala Val Ala Thr Leu Lys Asp Gly Leu Lys Phe Ala Gly				
1340		1345		1350
Asp Asn Ser Thr Glu Val Ile Thr Lys Thr Leu Asn Gln Lys Leu				
1355		1360		1365
Glu Ile Val Gly Gly Ala Asp Lys Asn Lys Leu Ser Asp Asn Asn				
1370		1375		1380
Ile Gly Val Asn Ala Asn Asn Gly Lys Leu Glu Val Lys Leu Ala				
1385		1390		1395
Lys Glu Leu Asn Glu Leu Thr Ser Ala Gln Phe Lys Asn Gly Asp				
1400		1405		1410
Asn Thr Thr Val Ile Asn Gly Asn Gly Ile Thr Ile Thr Pro Lys				
1415		1420		1425
Asp Pro Thr Lys Ala Val Ser Leu Thr Asp Lys Gly Leu Asn Asn				
1430		1435		1440
Gly Gly Asn Gln Ile Val Asn Ile Asp Ser Gly Leu Lys Gln Ala				
1445		1450		1455
Asp Gly Ser Thr Val Ala Leu Lys Asp Ala Ser Gly Asp Thr Leu				
1460		1465		1470
Lys Asn Ala Ala Asn Ile Gly Asp Leu Gln Lys Ser Ile Asn Asp				
1475		1480		1485
Ile Thr Asp Ala Ser Lys Asn Gly Gly Phe Gly Leu Ser Asp Asp				
1490		1495		1500
Asn Gly Ala Thr Ala Lys Ala Asn Leu Gly Glu Thr Arg Glu Ser				
1505		1510		1515
Glu Arg Arg Trp Gln Cys Tyr Tyr Lys Ser Ser Tyr Arg				
1520		1525		1530

<210> 45  
 <211> 565  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1)..(564)

<400> 45  
 caa gaa atc att aac cta gcg cct aaa ggc tta att acc gcc gcc agc 48  
 Gln Glu Ile Ile Asn Leu Ala Pro Lys Gly Leu Ile Thr Ala Ala Ser  
 1 5 10 15

cct tat tta tac ggt gta acc cgt agt gat ttg gaa aaa atc gtc atc 96  
 Pro Tyr Leu Tyr Gly Val Thr Arg Ser Asp Leu Glu Lys Ile Val Ile  
 20 25 30

atg ggc gtg tgg ttt gaa gac atg aaa acc ctc gcg ccc tac tgg caa 144  
 Met Gly Val Trp Phe Glu Asp Met Lys Thr Leu Ala Pro Tyr Trp Gln  
 35 40 45

atc acc ggc acg ccc acc ggt gtc aac ttt gac gaa cgc aac gcc atg 192  
 Ile Thr Gly Thr Pro Thr Gly Val Asn Phe Asp Glu Arg Asn Ala Met  
 50 55 60

atc ggc aaa acc ctc gcc gaa cgc tta aac ctg aaa gtg ggc agt aag 240  
 Ile Gly Lys Thr Leu Ala Glu Arg Leu Asn Leu Lys Val Gly Ser Lys  
 65 70 75 80

ctg acc tta agc ctg aat tcg gta gat aaa cac cag ttt acg att aaa 288  
 Leu Thr Leu Ser Leu Asn Ser Val Asp Lys His Gln Phe Thr Ile Lys  
 85 90 95

gcc atc gtg gaa gcg ggc gac gcc acc gac aat atg ctc atc gtg agc 336  
 Ala Ile Val Glu Ala Gly Asp Ala Thr Asp Asn Met Leu Ile Val Ser  
 100 105 110

ctg gat ttc gcg caa aac tgg ctg gaa aaa gaa aac ttt gcc acc aat 384  
 Leu Asp Phe Ala Gln Asn Trp Leu Glu Lys Glu Asn Phe Ala Thr Asn  
 115 120 125

gcc ctg ctt aac gtg aaa aat gat cag ggg caa gtg gaa caa ttc gca 432  
 Ala Leu Leu Asn Val Lys Asn Asp Gln Gly Gln Val Glu Gln Phe Ala  
 130 135 140

cag caa ctt cag caa caa tat ccc gat ttg gat att cat ccg atc cgc 480  
 Gln Gln Leu Gln Gln Gln Tyr Pro Asp Leu Asp Ile His Pro Ile Arg  
 145 150 155 160

aaa gtc tcc gcc tcc gaa ggg caa att ctg gat aag att aaa ggc ttg 528  
 Lys Val Ser Ala Ser Glu Gly Gln Ile Leu Asp Lys Ile Lys Gly Leu  
 165 170 175

atg ggc ttg att tcc gtg gtg att ctg att tta gcc a 565

Met Gly Leu Ile Ser Val Val Ile Leu Ile Leu Ala  
 180 185

<210> 46  
 <211> 188  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans  
 <400> 46

Gln Glu Ile Ile Asn Leu Ala Pro Lys Gly Leu Ile Thr Ala Ala Ser  
 1 5 10 15

Pro Tyr Leu Tyr Gly Val Thr Arg Ser Asp Leu Glu Lys Ile Val Ile  
 20 25 30

Met Gly Val Trp Phe Glu Asp Met Lys Thr Leu Ala Pro Tyr Trp Gln  
 35 40 45

Ile Thr Gly Thr Pro Thr Gly Val Asn Phe Asp Glu Arg Asn Ala Met  
 50 55 60

Ile Gly Lys Thr Leu Ala Glu Arg Leu Asn Leu Lys Val Gly Ser Lys  
 65 70 75 80

Leu Thr Leu Ser Leu Asn Ser Val Asp Lys His Gln Phe Thr Ile Lys  
 85 90 95

Ala Ile Val Glu Ala Gly Asp Ala Thr Asp Asn Met Leu Ile Val Ser  
 100 105 110

Leu Asp Phe Ala Gln Asn Trp Leu Glu Lys Glu Asn Phe Ala Thr Asn  
 115 120 125

Ala Leu Leu Asn Val Lys Asn Asp Gln Gly Gln Val Glu Gln Phe Ala  
 130 135 140

Gln Gln Leu Gln Gln Gln Tyr Pro Asp Leu Asp Ile His Pro Ile Arg  
 145 150 155 160

Lys Val Ser Ala Ser Glu Gly Gln Ile Leu Asp Lys Ile Lys Gly Leu  
 165 170 175

Met Gly Leu Ile Ser Val Val Ile Leu Ile Leu Ala  
 180 185

<210> 47  
 <211> 668  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1)..(666)

<400> 47  
 gcc aat cgg atc att gaa atc aaa gat ggt gaa att atc agt gat acg 48  
 Ala Asn Arg Ile Ile Glu Ile Lys Asp Gly Glu Ile Ile Ser Asp Thr  
 1 5 10 15  
 caa aaa cgt cag gta aaa agt gcg gtt aaa aat cca agt gtt ttt aaa 96  
 Gln Lys Arg Gln Val Lys Ser Ala Val Lys Asn Pro Ser Val Phe Lys  
 20 25 30  
 ggt cgt ttc ggt ttc agc aaa gat caa ctt atg gaa gcc ttc cgt atg 144  
 Gly Arg Phe Gly Phe Ser Lys Asp Gln Leu Met Glu Ala Phe Arg Met  
 35 40 45  
 tcc gtc agt gcc att gta gcg cac aaa atg cgc tca ttg ctg acc atg 192  
 Ser Val Ser Ala Ile Val Ala His Lys Met Arg Ser Leu Leu Thr Met  
 50 55 60  
 ctg gga att atc atc ggg atc act tcc gtc gtt tcc gtg gtg gcg tta 240  
 Leu Gly Ile Ile Ile Gly Ile Thr Ser Val Val Ser Val Val Ala Leu  
 65 70 75 80  
 gga aat ggt tca caa caa aag att ttg gaa aat att cgc ggt atc ggc 288  
 Gly Asn Gly Ser Gln Gln Lys Ile Leu Glu Asn Ile Arg Gly Ile Gly  
 85 90 95  
 aca aac aca atg acg att ttt aac ggt aat ggt ttc ggt gac cgt cgt 336  
 Thr Asn Thr Met Thr Ile Phe Asn Gly Asn Gly Phe Gly Asp Arg Arg  
 100 105 110  
 tca cgg cac att caa aac cta aaa atc agc gat gcc aat acg tta tcg 384  
 Ser Arg His Ile Gln Asn Leu Lys Ile Ser Asp Ala Asn Thr Leu Ser  
 115 120 125  
 aaa caa agt tat att caa agc gtt act cca aat acc tct tcc agc ggc 432  
 Lys Gln Ser Tyr Ile Gln Ser Val Thr Pro Asn Thr Ser Ser Ser Gly  
 130 135 140  
 att tta gtg gtc ggt aac aaa tcc ttc aca tcc gcc aat tta tat ggt 480  
 Ile Leu Val Val Gly Asn Lys Ser Phe Thr Ser Ala Asn Leu Tyr Gly  
 145 150 155 160  
 atc ggt gaa caa tat ttt gat gta gaa ggc ttg aag tta aaa cag ggc 528  
 Ile Gly Glu Gln Tyr Phe Asp Val Glu Gly Leu Lys Leu Lys Gln Gly  
 165 170 175  
 cgt tta tta acc gag gac gat gtg gat caa agc aac cag gtg gtc gtg 576

Arg Leu Leu Thr Glu Asp Asp Val Asp Gln Ser Asn Gln Val Val Val  
 180 185 190

ctg gac gaa agt gca aaa aaa gcc att ttt gcc aac gaa aat ccc ctt 624  
 Leu Asp Glu Ser Ala Lys Lys Ala Ile Phe Ala Asn Glu Asn Pro Leu  
 195 200 205

ggc aaa acg gtg att ttt aat aag cga cca ttt cgt gtc att gg 668  
 Gly Lys Thr Val Ile Phe Asn Lys Arg Pro Phe Arg Val Ile  
 210 215 220

<210> 48  
 <211> 222  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 48

Ala Asn Arg Ile Ile Glu Ile Lys Asp Gly Glu Ile Ile Ser Asp Thr  
 1 5 10 15

Gln Lys Arg Gln Val Lys Ser Ala Val Lys Asn Pro Ser Val Phe Lys  
 20 25 30

Gly Arg Phe Gly Phe Ser Lys Asp Gln Leu Met Glu Ala Phe Arg Met  
 35 40 45

Ser Val Ser Ala Ile Val Ala His Lys Met Arg Ser Leu Leu Thr Met  
 50 55 60

Leu Gly Ile Ile Ile Gly Ile Thr Ser Val Val Ser Val Val Ala Leu  
 65 70 75 80

Gly Asn Gly Ser Gln Gln Lys Ile Leu Glu Asn Ile Arg Gly Ile Gly  
 85 90 95

Thr Asn Thr Met Thr Ile Phe Asn Gly Asn Gly Phe Gly Asp Arg Arg  
 100 105 110

Ser Arg His Ile Gln Asn Leu Lys Ile Ser Asp Ala Asn Thr Leu Ser  
 115 120 125

Lys Gln Ser Tyr Ile Gln Ser Val Thr Pro Asn Thr Ser Ser Ser Gly  
 130 135 140

Ile Leu Val Val Gly Asn Lys Ser Phe Thr Ser Ala Asn Leu Tyr Gly  
 145 150 155 160



Ile Gly Glu Gln Tyr Phe Asp Val Glu Gly Leu Lys Leu Lys Gln Gly  
165 170 175

Arg Leu Leu Thr Glu Asp Asp Val Asp Gln Ser Asn Gln Val Val Val  
180 185 190

Leu Asp Glu Ser Ala Lys Lys Ala Ile Phe Ala Asn Glu Asn Pro Leu  
195 200 205

Gly Lys Thr Val Ile Phe Asn Lys Arg Pro Phe Arg Val Ile  
210 215 220

<210> 49  
<211> 276  
<212> DNA  
<213> Actinobacillus actinomycetemcomitans

<220>  
<221> CDS  
<222> (1)..(276)

<400> 49  
atg aga atg cac aat cct cca cac ccg gga gaa ctg tta aaa gaa tat 48  
Met Arg Met His Asn Pro Pro His Pro Gly Glu Leu Leu Lys Glu Tyr  
1 5 10 15

att gat ggc gtg agt gtc acg aag gtt gcc caa aaa tta ggt gtt tcg 96  
Ile Asp Gly Val Ser Val Thr Lys Val Ala Gln Lys Leu Gly Val Ser  
20 25 30

cgt gtt acg ctt tcc cgc att ctt aat ggg aaa gca agt ata acg cct 144  
Arg Val Thr Leu Ser Arg Ile Leu Asn Gly Lys Ala Ser Ile Thr Pro  
35 40 45

gaa atg gct gtg cga tta agc gaa tta ttg aat acc aca aca ccg aaa 192  
Glu Met Ala Val Arg Leu Ser Glu Leu Leu Asn Thr Thr Thr Pro Lys  
50 55 60

tta tgg ctg ggt atg caa gca gac tac gat tta tgg caa att gaa caa 240  
Leu Trp Leu Gly Met Gln Ala Asp Tyr Asp Leu Trp Gln Ile Glu Gln  
65 70 75 80

caa cac gcc gta ttc aac atc caa cca tta ttt aat 276  
Gln His Ala Val Phe Asn Ile Gln Pro Leu Phe Asn  
85 90

<210> 50  
<211> 92  
<212> PRT  
<213> Actinobacillus actinomycetemcomitans

<400> 50

Met Arg Met His Asn Pro Pro His Pro Gly Glu Leu Leu Lys Glu Tyr  
1 5 10 15

Ile Asp Gly Val Ser Val Thr Lys Val Ala Gln Lys Leu Gly Val Ser  
20 25 30

Arg Val Thr Leu Ser Arg Ile Leu Asn Gly Lys Ala Ser Ile Thr Pro  
35 40 45

Glu Met Ala Val Arg Leu Ser Glu Leu Leu Asn Thr Thr Thr Pro Lys  
50 55 60

Leu Trp Leu Gly Met Gln Ala Asp Tyr Asp Leu Trp Gln Ile Glu Gln  
65 70 75 80

Gln His Ala Val Phe Asn Ile Gln Pro Leu Phe Asn  
85 90

<210> 51

<211> 537

<212> DNA

<213> Actinobacillus actinomycetemcomitans

<220>

<221> CDS

<222> (1)..(537)

<400> 51

caa cat aat ggt gta cta ggt cct tat atc ggt aaa ggc agt tta acc 48  
Gln His Asn Gly Val Leu Gly Pro Tyr Ile Gly Lys Gly Ser Leu Thr  
1 5 10 15

tta aaa tta ccg gct tac tgg gaa cta tca gga ttc cat caa tta acc 96  
Leu Lys Leu Pro Ala Tyr Trp Glu Leu Ser Gly Phe His Gln Leu Thr  
20 25 30

gat caa tgg gct atc cac tat agc tat aaa tat aca gaa tgg agt cgt 144  
Asp Gln Trp Ala Ile His Tyr Ser Tyr Lys Tyr Thr Glu Trp Ser Arg  
35 40 45

ttt aaa gaa tta cgc ggc aaa tat caa gat ggt tcc ggc tat gag gcc 192  
Phe Lys Glu Leu Arg Gly Lys Tyr Gln Asp Gly Ser Gly Tyr Glu Ala  
50 55 60

ttt acc aag aaa gag gaa tac aaa gac aac tcc cgt ttt gct att ggt 240  
Phe Thr Lys Lys Glu Glu Tyr Lys Asp Asn Ser Arg Phe Ala Ile Gly  
65 70 75 80

aca aca tat agc cta aat gat gct tta aca tta cgt gca ggt ttg gct 288  
 Thr Thr Tyr Ser Leu Asn Asp Ala Leu Thr Leu Arg Ala Gly Leu Ala  
                   85                                  90                                  95

tac gat aaa gcc gcg agt aaa acg cat tta tct gcg tcc att cct gat 336  
 Tyr Asp Lys Ala Ala Ser Lys Thr His Leu Ser Ala Ser Ile Pro Asp  
                   100                                  105                                  110

acc gac cgt atg tgg tat agt ata gga gcc acc tat aaa ttc acc ccg 384  
 Thr Asp Arg Met Trp Tyr Ser Ile Gly Ala Thr Tyr Lys Phe Thr Pro  
                   115                                  120                                  125

aat tta tct gtt gat gtc ggc ttc gct cat tta cgt ggt aag aag aaa 432  
 Asn Leu Ser Val Asp Val Gly Phe Ala His Leu Arg Gly Lys Lys Lys  
                   130                                  135                                  140

cat ttt gtt gag acc caa aat atc aag ggg tta ttg ctt gtt gag gcg 480  
 His Phe Val Glu Thr Gln Asn Ile Lys Gly Leu Leu Leu Val Glu Ala  
                   145                                  150                                  155                                  160

gat tac acc act aaa gcc acc gct aac ctc tac ggt ttg aat cta aat 528  
 Asp Tyr Thr Thr Lys Ala Thr Ala Asn Leu Tyr Gly Leu Asn Leu Asn  
                                   165                                  170                                  175

tac cgt ttc 537  
 Tyr Arg Phe

<210> 52  
 <211> 179  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 52

Gln His Asn Gly Val Leu Gly Pro Tyr Ile Gly Lys Gly Ser Leu Thr  
 1                  5                                  10                                  15

Leu Lys Leu Pro Ala Tyr Trp Glu Leu Ser Gly Phe His Gln Leu Thr  
                   20                                  25                                  30

Asp Gln Trp Ala Ile His Tyr Ser Tyr Lys Tyr Thr Glu Trp Ser Arg  
                   35                                  40                                  45

Phe Lys Glu Leu Arg Gly Lys Tyr Gln Asp Gly Ser Gly Tyr Glu Ala  
                   50                                  55                                  60

Phe Thr Lys Lys Glu Glu Tyr Lys Asp Asn Ser Arg Phe Ala Ile Gly  
 65                  70                                  75                                  80

Thr Thr Tyr Ser Leu Asn Asp Ala Leu Thr Leu Arg Ala Gly Leu Ala

	85		90		95
Tyr Asp Lys Ala Ala Ser Lys Thr His Leu Ser Ala Ser Ile Pro Asp					
	100		105		110
Thr Asp Arg Met Trp Tyr Ser Ile Gly Ala Thr Tyr Lys Phe Thr Pro					
	115		120		125
Asn Leu Ser Val Asp Val Gly Phe Ala His Leu Arg Gly Lys Lys Lys					
	130		135		140
His Phe Val Glu Thr Gln Asn Ile Lys Gly Leu Leu Leu Val Glu Ala					
	145		150		155
Asp Tyr Thr Thr Lys Ala Thr Ala Asn Leu Tyr Gly Leu Asn Leu Asn					
	165		170		175
Tyr Arg Phe					

<210> 53  
 <211> 548  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans  
 <220>  
 <221> CDS  
 <222> (1)..(546)

<400> 53	
gga cca agt gtc acc aag gac ggc att cac gcc aat gat aag aaa atc	48
Gly Pro Ser Val Thr Lys Asp Gly Ile His Ala Asn Asp Lys Lys Ile	
1 5 10 15	
acc ggt gta aaa gac ggt gaa att tca gcc cat agt aaa gag gcg gtg	96
Thr Gly Val Lys Asp Gly Glu Ile Ser Ala His Ser Lys Glu Ala Val	
20 25 30	
aac ggt agc caa tta cat caa acc aac caa aat gtg acg aat tta gcc	144
Asn Gly Ser Gln Leu His Gln Thr Asn Gln Asn Val Thr Asn Leu Ala	
35 40 45	
aac aat gtg gac aaa ggg ctg aat ttc caa gga gac aat caa gaa gtc	192
Asn Asn Val Asp Lys Gly Leu Asn Phe Gln Gly Asp Asn Gln Glu Val	
50 55 60	
aca gtt aat cgt aaa tta ggc gat caa ctt aac att cgc ggc ggt gcg	240
Thr Val Asn Arg Lys Leu Gly Asp Gln Leu Asn Ile Arg Gly Gly Ala	
65 70 75 80	

gat ccg aag aaa tta aca caa aat aat atc ggc gtg acc gca gat aaa 288  
 Asp Pro Lys Lys Leu Thr Gln Asn Asn Ile Gly Val Thr Ala Asp Lys  
 85 90 95

aac ggc acc atg acc gtt cag ctg gcg aag gaa gtt aat ctc ggc gca 336  
 Asn Gly Thr Met Thr Val Gln Leu Ala Lys Glu Val Asn Leu Gly Ala  
 100 105 110

gat ggc agc ctt act gta ggc aat acc acg gtc aat aac gac ggt gtt 384  
 Asp Gly Ser Leu Thr Val Gly Asn Thr Thr Val Asn Asn Asp Gly Val  
 115 120 125

acg att aaa gac ggt cca agc atg aca agc cac ggc atc aac gcc ggc 432  
 Thr Ile Lys Asp Gly Pro Ser Met Thr Ser His Gly Ile Asn Ala Gly  
 130 135 140

ggc aaa cga att gct aac gtt gcg aaa ggg aaa gca ccg acg gat gca 480  
 Gly Lys Arg Ile Ala Asn Val Ala Lys Gly Lys Ala Pro Thr Asp Ala  
 145 150 155 160

gta aat atg agt cag ctt caa gac gtc ggc agt gcc att aat aat cgc 528  
 Val Asn Met Ser Gln Leu Gln Asp Val Gly Ser Ala Ile Asn Asn Arg  
 165 170 175

att gat aac att gat aag cg 548  
 Ile Asp Asn Ile Asp Lys  
 180

<210> 54  
 <211> 182  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 54

Gly Pro Ser Val Thr Lys Asp Gly Ile His Ala Asn Asp Lys Lys Ile  
 1 5 10 15

Thr Gly Val Lys Asp Gly Glu Ile Ser Ala His Ser Lys Glu Ala Val  
 20 25 30

Asn Gly Ser Gln Leu His Gln Thr Asn Gln Asn Val Thr Asn Leu Ala  
 35 40 45

Asn Asn Val Asp Lys Gly Leu Asn Phe Gln Gly Asp Asn Gln Glu Val  
 50 55 60

Thr Val Asn Arg Lys Leu Gly Asp Gln Leu Asn Ile Arg Gly Gly Ala  
 65 70 75 80

Asp Pro Lys Lys Leu Thr Gln Asn Asn Ile Gly Val Thr Ala Asp Lys



<213> Actinobacillus actinomycetemcomitans

<400> 56

Met Asp His Phe Pro Pro Leu Trp Leu Phe Arg Leu Asn Ser Leu Met  
1 5 10 15

Leu Leu Leu Leu Leu Leu Pro Leu His Lys Pro Val Gln Asn Pro Pro  
20 25 30

Cys Ser Gln Asn Arg Gln Ser Pro Tyr Pro Pro Arg His Asn Ser Lys  
35 40 45

Leu Leu Leu Leu Pro Pro Asp Ile  
50 55

<210> 57

<211> 492

<212> DNA

<213> Actinobacillus actinomycetemcomitans

<220>

<221> CDS

<222> (1)..(492)

<400> 57

atg acg aac aaa cca aaa tcc ggg ctc tca ttt ttg tgg tta agt acg 48  
Met Thr Asn Lys Pro Lys Ser Gly Leu Ser Phe Leu Trp Leu Ser Thr  
1 5 10 15

ctg gca ttt atc gcc gat att ttt acc aaa tac tta atc gta agc cat 96  
Leu Ala Phe Ile Ala Asp Ile Phe Thr Lys Tyr Leu Ile Val Ser His  
20 25 30

ttt gaa tac ggc gaa agc gta aat atc ctg ccg att ttt aat ttg acc 144  
Phe Glu Tyr Gly Glu Ser Val Asn Ile Leu Pro Ile Phe Asn Leu Thr  
35 40 45

tat gtg ggt aac ttt ggc gcc gct ttt agt ttc ctg gcg gat cat gac 192  
Tyr Val Gly Asn Phe Gly Ala Ala Phe Ser Phe Leu Ala Asp His Asp  
50 55 60

ggc tgg caa aaa ttc ttt ttc ctt gcg ttg gca gtg ggg att tcc gcc 240  
Gly Trp Gln Lys Phe Phe Phe Leu Ala Leu Ala Val Gly Ile Ser Ala  
65 70 75 80

atg ttg gtt tat ttt tta atg aaa aat cgc cat gaa caa aaa ctg ctg 288  
Met Leu Val Tyr Phe Leu Met Lys Asn Arg His Glu Gln Lys Leu Leu  
85 90 95

aat gcc gcc tac gct ttg att atc ggc ggc gct ttg ggc aat gcg gcg 336  
Asn Ala Ala Tyr Ala Leu Ile Ile Gly Gly Ala Leu Gly Asn Ala Ala  
100 105 110

gat cgt ctg tat cac ggc tat gtg gtg gat ttt tta gat ttc tat tgg	384
Asp Arg Leu Tyr His Gly Tyr Val Val Asp Phe Leu Asp Phe Tyr Trp	
115 120 125	
cgg gat tgg cat tat ccc gtg ttt aac ctg gcg gat att gcc att tgt	432
Arg Asp Trp His Tyr Pro Val Phe Asn Leu Ala Asp Ile Ala Ile Cys	
130 135 140	
gtg ggt gcc ggt ttg att gcc ttg gat gcg ttc aaa aac ggc aat aaa	480
Val Gly Ala Gly Leu Ile Ala Leu Asp Ala Phe Lys Asn Gly Asn Lys	
145 150 155 160	
cag gaa tgt aaa	492
Gln Glu Cys Lys	

<210> 58  
 <211> 164  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 58

Met Thr Asn Lys Pro Lys Ser Gly Leu Ser Phe Leu Trp Leu Ser Thr
1 5 10 15

Leu Ala Phe Ile Ala Asp Ile Phe Thr Lys Tyr Leu Ile Val Ser His
20 25 30

Phe Glu Tyr Gly Glu Ser Val Asn Ile Leu Pro Ile Phe Asn Leu Thr
35 40 45

Tyr Val Gly Asn Phe Gly Ala Ala Phe Ser Phe Leu Ala Asp His Asp
50 55 60

Gly Trp Gln Lys Phe Phe Phe Leu Ala Leu Ala Val Gly Ile Ser Ala
65 70 75 80

Met Leu Val Tyr Phe Leu Met Lys Asn Arg His Glu Gln Lys Leu Leu
85 90 95

Asn Ala Ala Tyr Ala Leu Ile Ile Gly Gly Ala Leu Gly Asn Ala Ala
100 105 110

Asp Arg Leu Tyr His Gly Tyr Val Val Asp Phe Leu Asp Phe Tyr Trp
115 120 125



Arg Asp Trp His Tyr Pro Val Phe Asn Leu Ala Asp Ile Ala Ile Cys  
 130 135 140

Val Gly Ala Gly Leu Ile Ala Leu Asp Ala Phe Lys Asn Gly Asn Lys  
 145 150 155 160

Gln Glu Cys Lys

<210> 59  
 <211> 453  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1)..(453)

<400> 59  
 atg gct aaa ttg tat ttt tac tat tcc acc atg aat gca gga aaa tcc 48  
 Met Ala Lys Leu Tyr Phe Tyr Tyr Ser Thr Met Asn Ala Gly Lys Ser  
 1 5 10 15

acc acc ttg ttg caa tct tcc tat aat tac cgc gaa cgt aac atg aac 96  
 Thr Thr Leu Leu Gln Ser Ser Tyr Asn Tyr Arg Glu Arg Asn Met Asn  
 20 25 30

acg ctg gtt tat aca gcg gcg ata gac gat cgt ttc ggc gta ggg cag 144  
 Thr Leu Val Tyr Thr Ala Ala Ile Asp Asp Arg Phe Gly Val Gly Gln  
 35 40 45

gtg act tcc cgc atc ggg att agc gaa cgg gcg aat acc ttt acc cgc 192  
 Val Thr Ser Arg Ile Gly Ile Ser Glu Arg Ala Asn Thr Phe Thr Arg  
 50 55 60

aat acg aat ttg ttc gct gaa att gaa caa cat ctg gcg cag gag ccg 240  
 Asn Thr Asn Leu Phe Ala Glu Ile Glu Gln His Leu Ala Gln Glu Pro  
 65 70 75 80

ctt cat tgt att ttg gtg gat gag gca cag ttt tta acc aaa gaa cag 288  
 Leu His Cys Ile Leu Val Asp Glu Ala Gln Phe Leu Thr Lys Glu Gln  
 85 90 95

gtt tat caa ctg agc gat gtg gtg gat aaa cta cat att ccc gtg ttg 336  
 Val Tyr Gln Leu Ser Asp Val Val Asp Lys Leu His Ile Pro Val Leu  
 100 105 110

tgc tac ggt ttg cgc acc gat ttc caa gcg gaa tta ttt gaa ggc agt 384  
 Cys Tyr Gly Leu Arg Thr Asp Phe Gln Ala Glu Leu Phe Glu Gly Ser  
 115 120 125

cgc tat tta ctg gcg tgg gcg gat cag ctg gaa gaa ctc aaa acc att 432  
 Arg Tyr Leu Leu Ala Trp Ala Asp Gln Leu Glu Glu Leu Lys Thr Ile  
 130 135 140

tgt tac tgc ggt cgc aaa gcc  
 Cys Tyr Cys Gly Arg Lys Ala  
 145 150

453

<210> 60  
 <211> 151  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans  
 <400> 60

Met Ala Lys Leu Tyr Phe Tyr Tyr Ser Thr Met Asn Ala Gly Lys Ser  
 1 5 10 15

Thr Thr Leu Leu Gln Ser Ser Tyr Asn Tyr Arg Glu Arg Asn Met Asn  
 20 25 30

Thr Leu Val Tyr Thr Ala Ala Ile Asp Asp Arg Phe Gly Val Gly Gln  
 35 40 45

Val Thr Ser Arg Ile Gly Ile Ser Glu Arg Ala Asn Thr Phe Thr Arg  
 50 55 60

Asn Thr Asn Leu Phe Ala Glu Ile Glu Gln His Leu Ala Gln Glu Pro  
 65 70 75 80

Leu His Cys Ile Leu Val Asp Glu Ala Gln Phe Leu Thr Lys Glu Gln  
 85 90 95

Val Tyr Gln Leu Ser Asp Val Val Asp Lys Leu His Ile Pro Val Leu  
 100 105 110

Cys Tyr Gly Leu Arg Thr Asp Phe Gln Ala Glu Leu Phe Glu Gly Ser  
 115 120 125

Arg Tyr Leu Leu Ala Trp Ala Asp Gln Leu Glu Glu Leu Lys Thr Ile  
 130 135 140

Cys Tyr Cys Gly Arg Lys Ala  
 145 150

<210> 61  
 <211> 643  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>

<221> CDS

<222> (1)..(642)

<400> 61

tat aac gaa aaa act tac gaa aat gac tta acc gca aaa gaa atc ttc 48  
Tyr Asn Glu Lys Thr Tyr Glu Asn Asp Leu Thr Ala Lys Glu Ile Phe  
1 5 10 15

gta act tat gta ttg aaa aac aaa ttg tta tgg tac atc gcc att gct 96  
Val Thr Tyr Val Leu Lys Asn Lys Leu Leu Trp Tyr Ile Ala Ile Ala  
20 25 30

aac gtg ttc gtt tac tta atc cgc tac ggc gta ttg aaa tgg tct ccg 144  
Asn Val Phe Val Tyr Leu Ile Arg Tyr Gly Val Leu Lys Trp Ser Pro  
35 40 45

gtt tac ttg agt gaa gtg aaa cac ttc aac atc aaa ggt acc gca tgg 192  
Val Tyr Leu Ser Glu Val Lys His Phe Asn Ile Lys Gly Thr Ala Trp  
50 55 60

gca tac acc att tat gaa ttg gcg gcc gtt ccg ggt aca tta ctt tgc 240  
Ala Tyr Thr Ile Tyr Glu Leu Ala Ala Val Pro Gly Thr Leu Leu Cys  
65 70 75 80

ggg tgg gta tct gac cat gta ttc aaa ggt aaa cgt ggc tta acc ggt 288  
Gly Trp Val Ser Asp His Val Phe Lys Gly Lys Arg Gly Leu Thr Gly  
85 90 95

ttc atc ttt atg att tta acc acc gca gcg gta gcc aca tac tgg atg 336  
Phe Ile Phe Met Ile Leu Thr Thr Ala Ala Val Ala Thr Tyr Trp Met  
100 105 110

aac cct gca aca ccg gaa gct gag ctt gca aac tac agc gca tgg tat 384  
Asn Pro Ala Thr Pro Glu Ala Glu Leu Ala Asn Tyr Ser Ala Trp Tyr  
115 120 125

gaa aac cca tac caa tta acc gac ttt att ttg atg acc tta atc ggt 432  
Glu Asn Pro Tyr Gln Leu Thr Asp Phe Ile Leu Met Thr Leu Ile Gly  
130 135 140

ttc tta atc tac ggc cct gtg atg cta atc ggc ttg cac gcc ctt gaa 480  
Phe Leu Ile Tyr Gly Pro Val Met Leu Ile Gly Leu His Ala Leu Glu  
145 150 155 160

ctt gca ccg aaa aaa gcg gca ggt acc gca gca ggt ttc acc ggt tta 528  
Leu Ala Pro Lys Lys Ala Ala Gly Thr Ala Ala Gly Phe Thr Gly Leu  
165 170 175

ttc ggt tac tta ggc ggt acc gtg tct gca tca gca gtt atc ggt tgg 576  
Phe Gly Tyr Leu Gly Gly Thr Val Ser Ala Ser Ala Val Ile Gly Trp  
180 185 190

gca gcc caa cac tac ggc tgg gac ggc ggt ttt tac gtg atg atc ggc 624  
Ala Ala Gln His Tyr Gly Trp Asp Gly Gly Phe Tyr Val Met Ile Gly  
195 200 205

ggt ggt atc tta ccg gtc a  
 Gly Gly Ile Leu Pro Val  
 210

643

<210> 62  
 <211> 214  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans  
 <400> 62

Tyr Asn Glu Lys Thr Tyr Glu Asn Asp Leu Thr Ala Lys Glu Ile Phe  
 1 5 10 15

Val Thr Tyr Val Leu Lys Asn Lys Leu Leu Trp Tyr Ile Ala Ile Ala  
 20 25 30

Asn Val Phe Val Tyr Leu Ile Arg Tyr Gly Val Leu Lys Trp Ser Pro  
 35 40 45

Val Tyr Leu Ser Glu Val Lys His Phe Asn Ile Lys Gly Thr Ala Trp  
 50 55 60

Ala Tyr Thr Ile Tyr Glu Leu Ala Ala Val Pro Gly Thr Leu Leu Cys  
 65 70 75 80

Gly Trp Val Ser Asp His Val Phe Lys Gly Lys Arg Gly Leu Thr Gly  
 85 90 95

Phe Ile Phe Met Ile Leu Thr Thr Ala Ala Val Ala Thr Tyr Trp Met  
 100 105 110

Asn Pro Ala Thr Pro Glu Ala Glu Leu Ala Asn Tyr Ser Ala Trp Tyr  
 115 120 125

Glu Asn Pro Tyr Gln Leu Thr Asp Phe Ile Leu Met Thr Leu Ile Gly  
 130 135 140

Phe Leu Ile Tyr Gly Pro Val Met Leu Ile Gly Leu His Ala Leu Glu  
 145 150 155 160

Leu Ala Pro Lys Lys Ala Ala Gly Thr Ala Ala Gly Phe Thr Gly Leu  
 165 170 175

Phe Gly Tyr Leu Gly Gly Thr Val Ser Ala Ser Ala Val Ile Gly Trp  
180 185 190

Ala Ala Gln His Tyr Gly Trp Asp Gly Gly Phe Tyr Val Met Ile Gly  
195 200 205

Gly Gly Ile Leu Pro Val  
210

<210> 63  
<211> 333  
<212> DNA  
<213> Actinobacillus actinomycetemcomitans

<220>  
<221> CDS  
<222> (1)..(333)

<400> 63  
gaa tgg gcg gga acg cct tat cgt atc ggc gga caa agt cgc agt ggc 48  
Glu Trp Ala Gly Thr Pro Tyr Arg Ile Gly Gly Gln Ser Arg Ser Gly  
1 5 10 15  
gtg gat tgc tcc ggt ttc gtg caa acc acc ttt ttc gat cgc ttc ggc 96  
Val Asp Cys Ser Gly Phe Val Gln Thr Thr Phe Phe Asp Arg Phe Gly  
20 25 30  
ata aaa ttg ccg cga caa acc aaa gat cag gca aat tac ggt cag tat 144  
Ile Lys Leu Pro Arg Gln Thr Lys Asp Gln Ala Asn Tyr Gly Gln Tyr  
35 40 45  
att gaa aaa ggc gat att caa acc ggt gat ttg gtg ttc ttt aaa acc 192  
Ile Glu Lys Gly Asp Ile Gln Thr Gly Asp Leu Val Phe Phe Lys Thr  
50 55 60  
ggt cgc ggt cct cat ggc tat cat gtg ggc att tat gtg aag gaa gac 240  
Gly Arg Gly Pro His Gly Tyr His Val Gly Ile Tyr Val Lys Glu Asp  
65 70 75 80  
aaa ttt ctg cac gcg tct act aag ggt ggc gtg att tat tcc tcg ttg 288  
Lys Phe Leu His Ala Ser Thr Lys Gly Gly Val Ile Tyr Ser Ser Leu  
85 90 95  
aac agc gat tat tgg cgt aag gca tat tgg cag gca aga cga att 333  
Asn Ser Asp Tyr Trp Arg Lys Ala Tyr Trp Gln Ala Arg Arg Ile  
100 105 110

<210> 64  
<211> 111  
<212> PRT  
<213> Actinobacillus actinomycetemcomitans

<400> 64

Glu Trp Ala Gly Thr Pro Tyr Arg Ile Gly Gly Gln Ser Arg Ser Gly  
1 5 10 15

Val Asp Cys Ser Gly Phe Val Gln Thr Thr Phe Phe Asp Arg Phe Gly  
20 25 30

Ile Lys Leu Pro Arg Gln Thr Lys Asp Gln Ala Asn Tyr Gly Gln Tyr  
35 40 45

Ile Glu Lys Gly Asp Ile Gln Thr Gly Asp Leu Val Phe Phe Lys Thr  
50 55 60

Gly Arg Gly Pro His Gly Tyr His Val Gly Ile Tyr Val Lys Glu Asp  
65 70 75 80

Lys Phe Leu His Ala Ser Thr Lys Gly Gly Val Ile Tyr Ser Ser Leu  
85 90 95

Asn Ser Asp Tyr Trp Arg Lys Ala Tyr Trp Gln Ala Arg Arg Ile  
100 105 110

<210> 65  
<211> 423  
<212> DNA  
<213> Actinobacillus actinomycetemcomitans

<220>  
<221> CDS  
<222> (1) .. (423)

<400> 65  
atg aaa aaa cgt tgc aca tgg gcg gaa aac tca caa att tat cag gat 48  
Met Lys Lys Arg Cys Thr Trp Ala Glu Asn Ser Gln Ile Tyr Gln Asp  
1 5 10 15

tac cac gac aac gaa tgg ggt aaa cca caa ttt gat gat cgc aaa tta 96  
Tyr His Asp Asn Glu Trp Gly Lys Pro Gln Phe Asp Asp Arg Lys Leu  
20 25 30

ttt gaa aaa ctg tgt ctg gaa ggg cag caa gcg ggc ctg tcg tgg att 144  
Phe Glu Lys Leu Cys Leu Glu Gly Gln Gln Ala Gly Leu Ser Trp Ile  
35 40 45

acg gta tta aaa aaa cgg gaa gct tat cgg cag gcg ttt ttc cat ttt 192  
Thr Val Leu Lys Lys Arg Glu Ala Tyr Arg Gln Ala Phe Phe His Phe  
50 55 60

gat ccg cac aaa gtc gca gca atg act gat gcc gat atc gat cac tgt 240  
Asp Pro His Lys Val Ala Ala Met Thr Asp Ala Asp Ile Asp His Cys

65	70	75	80	
atg caa aat aca ggc tta att cgc cat cgc gct aaa tta cag gca atc				288
Met Gln Asn Thr Gly Leu Ile Arg His Arg Ala Lys Leu Gln Ala Ile	85	90	95	
gtc acc aat gcg cgg gcg ttt ctt gcc atg caa aag tgc ggt gaa aat				336
Val Thr Asn Ala Arg Ala Phe Leu Ala Met Gln Lys Cys Gly Glu Asn	100	105	110	
ttc agt cat ttt att tgg tct ttc gtg aat cat cag ccg caa att cat				384
Phe Ser His Phe Ile Trp Ser Phe Val Asn His Gln Pro Gln Ile His	115	120	125	
gac gtg ccc gag tta agc cat gtg ccg gcg caa acg gca				423
Asp Val Pro Glu Leu Ser His Val Pro Ala Gln Thr Ala	130	135	140	

<210> 66  
 <211> 141  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 66

Met Lys Lys Arg Cys Thr Trp Ala Glu Asn Ser Gln Ile Tyr Gln Asp	
1 5 10 15	

Tyr His Asp Asn Glu Trp Gly Lys Pro Gln Phe Asp Asp Arg Lys Leu	
20 25 30	

Phe Glu Lys Leu Cys Leu Glu Gly Gln Gln Ala Gly Leu Ser Trp Ile	
35 40 45	

Thr Val Leu Lys Lys Arg Glu Ala Tyr Arg Gln Ala Phe Phe His Phe	
50 55 60	

Asp Pro His Lys Val Ala Ala Met Thr Asp Ala Asp Ile Asp His Cys	
65 70 75 80	

Met Gln Asn Thr Gly Leu Ile Arg His Arg Ala Lys Leu Gln Ala Ile	
85 90 95	

Val Thr Asn Ala Arg Ala Phe Leu Ala Met Gln Lys Cys Gly Glu Asn	
100 105 110	

Phe Ser His Phe Ile Trp Ser Phe Val Asn His Gln Pro Gln Ile His	
115 120 125	

Asp Val Pro Glu Leu Ser His Val Pro Ala Gln Thr Ala  
 130 135 140

<210> 67  
 <211> 375  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1)..(375)

<400> 67  
 gac atc gtt aca ttt acc caa aaa cgc tgc ccg ttt aat cac atg acg 48  
 Asp Ile Val Thr Phe Thr Gln Lys Arg Cys Pro Phe Asn His Met Thr  
 1 5 10 15  
 gtg gcg tat caa aaa agt gcg gtc ata aat tgc ggc gga tat gag gat 96  
 Val Ala Tyr Gln Lys Ser Ala Val Ile Asn Cys Gly Gly Tyr Glu Asp  
 20 25 30  
 tta cag gaa gat tat tat ttg tgg atc aaa ctg gtg gcg caa ggg cag 144  
 Leu Gln Glu Asp Tyr Tyr Leu Trp Ile Lys Leu Val Ala Gln Gly Gln  
 35 40 45  
 cgc gta gca aat tta ccc gat att ttg gtc tat gcg cgc gtc ggc aac 192  
 Arg Val Ala Asn Leu Pro Asp Ile Leu Val Tyr Ala Arg Val Gly Asn  
 50 55 60  
 ggc atg gta ggg cga cgc cgt ggt tta aac caa gcc aaa gcg gaa tgg 240  
 Gly Met Val Gly Arg Arg Arg Gly Leu Asn Gln Ala Lys Ala Glu Trp  
 65 70 75 80  
 cgc tta ttt aag cta aaa cac cat ctt ggc att cag gga ttt tta tcc 288  
 Arg Leu Phe Lys Leu Lys His His Leu Gly Ile Gln Gly Phe Leu Ser  
 85 90 95  
 ggg cta ttc act ttt gtc ctg cgt tcc ggt gcc aga tta ttg ccg aca 336  
 Gly Leu Phe Thr Phe Val Leu Arg Ser Gly Ala Arg Leu Leu Pro Thr  
 100 105 110  
 tca tta ctg aaa aac atc tat caa acc ttt tta aga aaa 375  
 Ser Leu Leu Lys Asn Ile Tyr Gln Thr Phe Leu Arg Lys  
 115 120 125

<210> 68  
 <211> 125  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 68

Asp Ile Val Thr Phe Thr Gln Lys Arg Cys Pro Phe Asn His Met Thr  
 1 5 10 15



Val Ala Tyr Gln Lys Ser Ala Val Ile Asn Cys Gly Gly Tyr Glu Asp  
20 25 30

Leu Gln Glu Asp Tyr Tyr Leu Trp Ile Lys Leu Val Ala Gln Gly Gln  
35 40 45

Arg Val Ala Asn Leu Pro Asp Ile Leu Val Tyr Ala Arg Val Gly Asn  
50 55 60

Gly Met Val Gly Arg Arg Arg Gly Leu Asn Gln Ala Lys Ala Glu Trp  
65 70 75 80

Arg Leu Phe Lys Leu Lys His His Leu Gly Ile Gln Gly Phe Leu Ser  
85 90 95

Gly Leu Phe Thr Phe Val Leu Arg Ser Gly Ala Arg Leu Leu Pro Thr  
100 105 110

Ser Leu Leu Lys Asn Ile Tyr Gln Thr Phe Leu Arg Lys  
115 120 125

<210> 69  
<211> 1005  
<212> DNA  
<213> Actinobacillus actinomycetemcomitans

<220>  
<221> CDS  
<222> (1)..(1005)

<400> 69  
tcc ggt aaa tcc gtc ggc gta aat acc atg att tta agc ctg ctt tac 48  
Ser Gly Lys Ser Val Gly Val Asn Thr Met Ile Leu Ser Leu Leu Tyr  
1 5 10 15

cgc gtt aaa ccg gaa gaa gtg aaa ttc atc atg att gac ccg aaa gtg 96  
Arg Val Lys Pro Glu Glu Val Lys Phe Ile Met Ile Asp Pro Lys Val  
20 25 30

gtg gaa ttg tct att tat aat gat att ccg cat ctt tta acg gaa gtg 144  
Val Glu Leu Ser Ile Tyr Asn Asp Ile Pro His Leu Leu Thr Glu Val  
35 40 45

gtc acg gac atg aaa aaa gcg gca aac gcg ttg cgc tgg tgt gta gac 192  
Val Thr Asp Met Lys Lys Ala Ala Asn Ala Leu Arg Trp Cys Val Asp  
50 55 60

gaa atg gag cgc cgt tat caa tta ttg tct gct ttg cgg gtg cgt aat 240

Glu Met Glu Arg Arg Tyr Gln Leu Leu Ser Ala Leu Arg Val Arg Asn	
65 70 75 80	
att gaa gga ttt aac gag aaa gtt gat gaa tat gag gcc tta aat atg	288
Ile Glu Gly Phe Asn Glu Lys Val Asp Glu Tyr Glu Ala Leu Asn Met	
85 90 95	
ccg att ccg aac ccg tta tgg aag ccg ggc gat tcc atg gat act ttg	336
Pro Ile Pro Asn Pro Leu Trp Lys Pro Gly Asp Ser Met Asp Thr Leu	
100 105 110	
ccg cca cca tta gaa aaa ctg agt tac att gtg gtg att gtg gat gaa	384
Pro Pro Pro Leu Glu Lys Leu Ser Tyr Ile Val Val Ile Val Asp Glu	
115 120 125	
ttc gcc gat ttg atg atg gtg gca ggc aaa cag gtg gaa gag ctt atc	432
Phe Ala Asp Leu Met Met Val Ala Gly Lys Gln Val Glu Glu Leu Ile	
130 135 140	
gca cgt ttg gcg caa aaa gcc cgt gcg gtg ggg att cac tta att ttg	480
Ala Arg Leu Ala Gln Lys Ala Arg Ala Val Gly Ile His Leu Ile Leu	
145 150 155 160	
gca acc caa cgc cct tcc gta gat gtg att acc ggt ttg att aaa gcg	528
Ala Thr Gln Arg Pro Ser Val Asp Val Ile Thr Gly Leu Ile Lys Ala	
165 170 175	
aac gta ccg agt cga att gcg ttt act gtg gcg act aaa att gac tcg	576
Asn Val Pro Ser Arg Ile Ala Phe Thr Val Ala Thr Lys Ile Asp Ser	
180 185 190	
cgt act att ctt gat gca ggc ggt gcg gaa tcc tta ttg ggt aaa ggt	624
Arg Thr Ile Leu Asp Ala Gly Gly Ala Glu Ser Leu Leu Gly Lys Gly	
195 200 205	
gat atg ctg tat tcc cca cag ggt tct acc gaa tta gtc cgt att cac	672
Asp Met Leu Tyr Ser Pro Gln Gly Ser Thr Glu Leu Val Arg Ile His	
210 215 220	
ggg gcc ttt atg act gat gac gaa gtc gtg cgc gtg gta gat gat tgg	720
Gly Ala Phe Met Thr Asp Asp Glu Val Val Arg Val Val Asp Asp Trp	
225 230 235 240	
aaa gca cgc ggt aaa ccg aat tac att gat ggt att tta gag ggt gat	768
Lys Ala Arg Gly Lys Pro Asn Tyr Ile Asp Gly Ile Leu Glu Gly Asp	
245 250 255	
gaa gaa gat gcc ggt gcg gaa cgc tta agt gag cgt ggc ggc gaa acc	816
Glu Glu Asp Ala Gly Ala Glu Arg Leu Ser Glu Arg Gly Gly Glu Thr	
260 265 270	
gac ggg ttg ttt gat gaa gtg gta gag ttt gtg gtc agc aca ggc acc	864
Asp Gly Leu Phe Asp Glu Val Val Glu Phe Val Val Ser Thr Gly Thr	
275 280 285	
acg tct att tct gcg att caa cgc cgt ttc cga gta ggc ttt aac cgt	912
Thr Ser Ile Ser Ala Ile Gln Arg Arg Phe Arg Val Gly Phe Asn Arg	

290	295	300	
gcc gcc aat att atg gat cag ctg gaa gag cag ggc att gtt tcg ccg			960
Ala Ala Asn Ile Met Asp Gln Leu Glu Glu Gln Gly Ile Val Ser Pro			
305	310	315	320

gtg caa aac ggt aaa cgt gaa gtg ttg gcg cgc agt gcg gat tat	1005
Val Gln Asn Gly Lys Arg Glu Val Leu Ala Arg Ser Ala Asp Tyr	
325	330
	335

<210> 70  
 <211> 335  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 70

Ser Gly Lys Ser Val Gly Val Asn Thr Met Ile Leu Ser Leu Leu Tyr
1 5 10 15

Arg Val Lys Pro Glu Glu Val Lys Phe Ile Met Ile Asp Pro Lys Val
20 25 30

Val Glu Leu Ser Ile Tyr Asn Asp Ile Pro His Leu Leu Thr Glu Val
35 40 45

Val Thr Asp Met Lys Lys Ala Ala Asn Ala Leu Arg Trp Cys Val Asp
50 55 60

Glu Met Glu Arg Arg Tyr Gln Leu Leu Ser Ala Leu Arg Val Arg Asn
65 70 75 80

Ile Glu Gly Phe Asn Glu Lys Val Asp Glu Tyr Glu Ala Leu Asn Met
85 90 95

Pro Ile Pro Asn Pro Leu Trp Lys Pro Gly Asp Ser Met Asp Thr Leu
100 105 110

Pro Pro Pro Leu Glu Lys Leu Ser Tyr Ile Val Val Ile Val Asp Glu
115 120 125

Phe Ala Asp Leu Met Met Val Ala Gly Lys Gln Val Glu Glu Leu Ile
130 135 140

Ala Arg Leu Ala Gln Lys Ala Arg Ala Val Gly Ile His Leu Ile Leu
145 150 155 160

Ala Thr Gln Arg Pro Ser Val Asp Val Ile Thr Gly Leu Ile Lys Ala  
165 170 175

Asn Val Pro Ser Arg Ile Ala Phe Thr Val Ala Thr Lys Ile Asp Ser  
180 185 190

Arg Thr Ile Leu Asp Ala Gly Gly Ala Glu Ser Leu Leu Gly Lys Gly  
195 200 205

Asp Met Leu Tyr Ser Pro Gln Gly Ser Thr Glu Leu Val Arg Ile His  
210 215 220

Gly Ala Phe Met Thr Asp Asp Glu Val Val Arg Val Val Asp Asp Trp  
225 230 235 240

Lys Ala Arg Gly Lys Pro Asn Tyr Ile Asp Gly Ile Leu Glu Gly Asp  
245 250 255

Glu Glu Asp Ala Gly Ala Glu Arg Leu Ser Glu Arg Gly Gly Glu Thr  
260 265 270

Asp Gly Leu Phe Asp Glu Val Val Glu Phe Val Val Ser Thr Gly Thr  
275 280 285

Thr Ser Ile Ser Ala Ile Gln Arg Arg Phe Arg Val Gly Phe Asn Arg  
290 295 300

Ala Ala Asn Ile Met Asp Gln Leu Glu Glu Gln Gly Ile Val Ser Pro  
305 310 315 320

Val Gln Asn Gly Lys Arg Glu Val Leu Ala Arg Ser Ala Asp Tyr  
325 330 335

<210> 71  
<211> 426  
<212> DNA  
<213> Actinobacillus actinomycetemcomitans

<220>  
<221> CDS  
<222> (1)..(426)

<400> 71  
atg tcg cct aat tat cct tat att aaa aca ttg gtt ata ttt cct ctg  
Met Ser Pro Asn Tyr Pro Tyr Ile Lys Thr Leu Val Ile Phe Pro Leu

48

1	5	10	15	
ctt gct caa ctt atc ggc acc atc atc agc att tgt gtg gat gac aat	96			
Leu Ala Gln Leu Ile Gly Thr Ile Ile Ser Ile Cys Val Asp Asp Asn				
20 25 30				
act gac agt ttt ctc ggc act gcc gac gtg atc ctt ttt agt ctg tta	144			
Thr Asp Ser Phe Leu Gly Thr Ala Asp Val Ile Leu Phe Ser Leu Leu				
35 40 45				
tcg act ttt atc gtg gca acc gtg ccc gct ttt ttg att gca ctg tgg	192			
Ser Thr Phe Ile Val Ala Thr Val Pro Ala Phe Leu Ile Ala Leu Trp				
50 55 60				
aca aaa att tat cgc tat acg cgc tat aac atg atg gcg att gtg tta	240			
Thr Lys Ile Tyr Arg Tyr Thr Arg Tyr Asn Met Met Ala Ile Val Leu				
65 70 75 80				
atc tcg ctg att atc gct ttt tgt tat ggc aac gta gct agc ttt atc	288			
Ile Ser Leu Ile Ile Ala Phe Cys Tyr Gly Asn Val Ala Ser Phe Ile				
85 90 95				
tac atg acg ttc tct cag cca aac atg acg ttt ggt att tgg ctg cgt	336			
Tyr Met Thr Phe Ser Gln Pro Asn Met Thr Phe Gly Ile Trp Leu Arg				
100 105 110				
agc ggc ggc att gat atg gcg ttt tta ctg agt ttc ggc atg gcg ttg	384			
Ser Gly Gly Ile Asp Met Ala Phe Leu Leu Ser Phe Gly Met Ala Leu				
115 120 125				
tat tca gtt ctt gtc ttg cct ttg ttg tta ccg caa acc aga	426			
Tyr Ser Val Leu Val Leu Pro Leu Leu Leu Pro Gln Thr Arg				
130 135 140				

<210> 72  
 <211> 142  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 72

Met Ser Pro Asn Tyr Pro Tyr Ile Lys Thr Leu Val Ile Phe Pro Leu
1 5 10 15
Leu Ala Gln Leu Ile Gly Thr Ile Ile Ser Ile Cys Val Asp Asp Asn
20 25 30
Thr Asp Ser Phe Leu Gly Thr Ala Asp Val Ile Leu Phe Ser Leu Leu
35 40 45
Ser Thr Phe Ile Val Ala Thr Val Pro Ala Phe Leu Ile Ala Leu Trp
50 55 60

Thr Lys Ile Tyr Arg Tyr Thr Arg Tyr Asn Met Met Ala Ile Val Leu  
65 70 75 80

Ile Ser Leu Ile Ile Ala Phe Cys Tyr Gly Asn Val Ala Ser Phe Ile  
85 90 95

Tyr Met Thr Phe Ser Gln Pro Asn Met Thr Phe Gly Ile Trp Leu Arg  
100 105 110

Ser Gly Gly Ile Asp Met Ala Phe Leu Leu Ser Phe Gly Met Ala Leu  
115 120 125

Tyr Ser Val Leu Val Leu Pro Leu Leu Leu Pro Gln Thr Arg  
130 135 140

<210> 73  
<211> 600  
<212> DNA  
<213> Actinobacillus actinomycetemcomitans

<220>  
<221> CDS  
<222> (1)..(600)

<400> 73  
gta tct caa caa aac cgc tgc gga ttc cac cac gga ttc aat aat gaa 48  
Val Ser Gln Gln Asn Arg Cys Gly Phe His His Gly Phe Asn Asn Glu  
1 5 10 15

aga gga aaa ata atc atg ttg gca aga atg tta ttt caa tcc tgg cgt 96  
Arg Gly Lys Ile Ile Met Leu Ala Arg Met Leu Phe Gln Ser Trp Arg  
20 25 30

tat gat tta aag cgc aaa ctc ctc gcc att gtg acc att ttc ctc gct 144  
Tyr Asp Leu Lys Arg Lys Leu Leu Ala Ile Val Thr Ile Phe Leu Ala  
35 40 45

gcc gga tta att tcc gcc ttg ctt gcg gtg tcc atc gac atc ggc gac 192  
Ala Gly Leu Ile Ser Ala Leu Leu Ala Val Ser Ile Asp Ile Gly Asp  
50 55 60

aaa atg gcg aaa gag ctt aaa tcc tac ggc gcc aat att ctg gtg gag 240  
Lys Met Ala Lys Glu Leu Lys Ser Tyr Gly Ala Asn Ile Leu Val Glu  
65 70 75 80

ccc gcc agc agc gcc att ttg cct gat gaa gtg agc cgt aat aat tct 288  
Pro Ala Ser Ser Ala Ile Leu Pro Asp Glu Val Ser Arg Asn Asn Ser  
85 90 95

ctc gcc acg caa gat ttt ttg gac gaa aaa gaa ctg ccg aac att aaa 336  
Leu Ala Thr Gln Asp Phe Leu Asp Glu Lys Glu Leu Pro Asn Ile Lys

100	105	110	
gac att ttt tgg cgt aac aat att gta ggc ttc gcc ccg tta ctc agc			384
Asp Ile Phe Trp Arg Asn Asn Ile Val Gly Phe Ala Pro Leu Leu Ser			
115	120	125	
gca caa gtc aaa gcc gat gga cca aac ggc aag gcg caa gac atc gac			432
Ala Gln Val Lys Ala Asp Gly Pro Asn Gly Lys Ala Gln Asp Ile Asp			
130	135	140	
att ctc ggc acg ttt ttt gat cat caa atc gcc gtg ccg gat gaa gac			480
Ile Leu Gly Thr Phe Phe Asp His Gln Ile Ala Val Pro Asp Glu Asp			
145	150	155	160
gat tac cac acc ggg caa aaa atc atc aac cct tat tgg cag gtg gaa			528
Asp Tyr His Thr Gly Gln Lys Ile Ile Asn Pro Tyr Trp Gln Val Glu			
165	170	175	
ggc gaa tgg gtg aac gat gcc acc gat gat ttc agc gaa cag gtt cct			576
Gly Glu Trp Val Asn Asp Ala Thr Asp Asp Phe Ser Glu Gln Val Pro			
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Ala Leu Leu Gly Ala Gln Leu Ala			
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Arg Gly Lys Ile Ile Met Leu Ala Arg Met Leu Phe Gln Ser Trp Arg			
20	25	30	
Tyr Asp Leu Lys Arg Lys Leu Leu Ala Ile Val Thr Ile Phe Leu Ala			
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Ala Gly Leu Ile Ser Ala Leu Leu Ala Val Ser Ile Asp Ile Gly Asp			
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Lys Met Ala Lys Glu Leu Lys Ser Tyr Gly Ala Asn Ile Leu Val Glu			
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Pro Ala Ser Ser Ala Ile Leu Pro Asp Glu Val Ser Arg Asn Asn Ser			
85	90	95	

Leu Ala Thr Gln Asp Phe Leu Asp Glu Lys Glu Leu Pro Asn Ile Lys  
 100 105 110

Asp Ile Phe Trp Arg Asn Asn Ile Val Gly Phe Ala Pro Leu Leu Ser  
 115 120 125

Ala Gln Val Lys Ala Asp Gly Pro Asn Gly Lys Ala Gln Asp Ile Asp  
 130 135 140

Ile Leu Gly Thr Phe Phe Asp His Gln Ile Ala Val Pro Asp Glu Asp  
 145 150 155 160

Asp Tyr His Thr Gly Gln Lys Ile Ile Asn Pro Tyr Trp Gln Val Glu  
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Gly Glu Trp Val Asn Asp Ala Thr Asp Asp Phe Ser Glu Gln Val Pro  
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Ala Leu Leu Gly Ala Gln Leu Ala  
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gca ttg aat cat ggt tta acg gtt gcc aag gga aaa tac gtt gcc tgt 96  
 Ala Leu Asn His Gly Leu Thr Val Ala Lys Gly Lys Tyr Val Ala Cys  
 20 25 30

atc gac ggt gat gcg gta ttg gat tac tac gcg ctg gac tac atg gtt 144  
 Ile Asp Gly Asp Ala Val Leu Asp Tyr Tyr Ala Leu Asp Tyr Met Val  
 35 40 45

caa gcc tta gag caa gat ccg aaa tat gct gct acc aca ggt aat ccg 192  
 Gln Ala Leu Glu Gln Asp Pro Lys Tyr Ala Ala Thr Thr Gly Asn Pro  
 50 55 60

cgt gta cgt aac cgt agt act att ttg ggg cgt tta cag gta tcc gag 240  
 Arg Val Arg Asn Arg Ser Thr Ile Leu Gly Arg Leu Gln Val Ser Glu



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ttc agc tcc atc atc ggt cta att aag cgg gca caa ggt cta atg ggc				288
Phe Ser Ser Ile Ile Gly Leu Ile Lys Arg Ala Gln Gly Leu Met Gly	85	90	95	
aca atc ttt acc gtt tcc ggc gtg tgt tgt tta ttc cgt aaa gat gtc				336
Thr Ile Phe Thr Val Ser Gly Val Cys Cys Leu Phe Arg Lys Asp Val	100	105	110	
atg gaa gaa atc ggt gga tgg agt act aac atg atc acc gaa gac att				384
Met Glu Glu Ile Gly Gly Trp Ser Thr Asn Met Ile Thr Glu Asp Ile	115	120	125	
gat att agc tgg aaa att caa att gcc ggt tac aac atc atg tac gaa				432
Asp Ile Ser Trp Lys Ile Gln Ile Ala Gly Tyr Asn Ile Met Tyr Glu	130	135	140	
cca cgc gca ctc tgc tgg gtg ctt atg ccg gaa agc ata aaa ggg ctt				480
Pro Arg Ala Leu Cys Trp Val Leu Met Pro Glu Ser Ile Lys Gly Leu	145	150	155	160
tat aaa cag cgt ttg cgt tgg gca caa ggc ggt gcg gaa act atc atg				528
Tyr Lys Gln Arg Leu Arg Trp Ala Gln Gly Gly Ala Glu Thr Ile Met	165	170	175	
aag tat ttt tgc aaa ata tgg cat tgg cgg aat cgt cgc ttg tgg cca				576
Lys Tyr Phe Ser Lys Ile Trp His Trp Arg Asn Arg Arg Leu Trp Pro	180	185	190	
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Met Tyr Ile Glu Tyr Phe Ala Thr Val	195	200		

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Ile Asp Gly Asp Ala Val Leu Asp Tyr Tyr Ala Leu Asp Tyr Met Val			
	35	40	45
Gln Ala Leu Glu Gln Asp Pro Lys Tyr Ala Ala Thr Thr Gly Asn Pro			
	50	55	60

Arg Val Arg Asn Arg Ser Thr Ile Leu Gly Arg Leu Gln Val Ser Glu  
65 70 75 80

Phe Ser Ser Ile Ile Gly Leu Ile Lys Arg Ala Gln Gly Leu Met Gly  
85 90 95

Thr Ile Phe Thr Val Ser Gly Val Cys Cys Leu Phe Arg Lys Asp Val  
100 105 110

Met Glu Glu Ile Gly Gly Trp Ser Thr Asn Met Ile Thr Glu Asp Ile  
115 120 125

Asp Ile Ser Trp Lys Ile Gln Ile Ala Gly Tyr Asn Ile Met Tyr Glu  
130 135 140

Pro Arg Ala Leu Cys Trp Val Leu Met Pro Glu Ser Ile Lys Gly Leu  
145 150 155 160

Tyr Lys Gln Arg Leu Arg Trp Ala Gln Gly Gly Ala Glu Thr Ile Met  
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Lys Tyr Phe Ser Lys Ile Trp His Trp Arg Asn Arg Arg Leu Trp Pro  
180 185 190

Met Tyr Ile Glu Tyr Phe Ala Thr Val  
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ctt tcc tcc tcc ttt gcc aat cag cac aag gcg aca acg cat aaa gcg 96  
Leu Ser Ser Ser Phe Ala Asn Gln His Lys Ala Thr Thr His Lys Ala  
20 25 30

aat gtt gcc cat acg cac gcc aaa ccg gag caa cac cac gca gaa tta 144  
Asn Val Ala His Thr His Ala Lys Pro Glu Gln His His Ala Glu Leu

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Lys Ser Ala Val Lys Asn Asn Gly Val Phe Ile Asn Gln Thr Val Phe			
65	70	75	80
ctg aaa ctg att gag gat ttg aaa ggc tat ccg ttg caa aca gat gcc			288
Leu Lys Leu Ile Glu Asp Leu Lys Gly Tyr Pro Leu Gln Thr Asp Ala			
	85	90	95
ata gcg gct tat ttc gac gcc tgc att aaa agc gta aat cac gac aca			336
Ile Ala Ala Tyr Phe Asp Ala Cys Ile Lys Ser Val Asn His Asp Thr			
	100	105	110
tcg aag gga gaa gtt aag gcg cta aaa cag gac att gag caa ttt atc			384
Ser Lys Gly Glu Val Lys Ala Leu Lys Gln Asp Ile Glu Gln Phe Ile			
	115	120	125
gaa aag cat ccg act cat ttt cta cgg gaa aaa ttg gaa caa aga ctt			432
Glu Lys His Pro Thr His Phe Leu Arg Glu Lys Leu Glu Gln Arg Leu			
	130	135	140
ttt acc tta ttt atc aac acg gaa gat ctt gaa ggc tta gtt ggt tac			480
Phe Thr Leu Phe Ile Asn Thr Glu Asp Leu Glu Gly Leu Val Gly Tyr			
	145	150	155
gcg caa cgg gtt aaa ccg aaa ggg ttg gaa gcc caa ctt gca gtg ttg			528
Ala Gln Arg Val Lys Pro Lys Gly Leu Glu Ala Gln Leu Ala Val Leu			
	165	170	175
aat gcc gaa tat caa ctg ggg cgc aaa cgt gcc gaa tct gat aaa aat			576
Asn Ala Glu Tyr Gln Leu Gly Arg Lys Arg Ala Glu Ser Asp Lys Asn			
	180	185	190
ccg aat gcg aat gtg tcg aaa atc atc gcc cgt tat gag caa ctt tgg			624
Pro Asn Ala Asn Val Ser Lys Ile Ile Ala Arg Tyr Glu Gln Leu Trp			
	195	200	205
tta aac aat agt gaa ctg cca aac gat gcg cag cta cgg gca aaa tgg			672
Leu Asn Asn Ser Glu Leu Pro Asn Asp Ala Gln Leu Arg Ala Lys Trp			
	210	215	220
tat tcc gac ggc ggc aga atg gca gaa aaa gtg tat caa aaa gct gag			720
Tyr Ser Asp Gly Gly Arg Met Ala Glu Lys Val Tyr Gln Lys Ala Glu			
	225	230	235
aat ctc ttt atc aaa aac aat gta aaa ggc ttg gaa ttg			759
Asn Leu Phe Ile Lys Asn Asn Val Lys Gly Leu Glu Leu			
	245	250	

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Asn Val Ala His Thr His Ala Lys Pro Glu Gln His His Ala Glu Leu  
35 40 45

Glu Arg Leu Lys Gln Arg Ala Thr Phe Leu Gln Leu Glu Ser Leu Leu  
50 55 60

Lys Ser Ala Val Lys Asn Asn Gly Val Phe Ile Asn Gln Thr Val Phe  
65 70 75 80

Leu Lys Leu Ile Glu Asp Leu Lys Gly Tyr Pro Leu Gln Thr Asp Ala  
85 90 95

Ile Ala Ala Tyr Phe Asp Ala Cys Ile Lys Ser Val Asn His Asp Thr  
100 105 110

Ser Lys Gly Glu Val Lys Ala Leu Lys Gln Asp Ile Glu Gln Phe Ile  
115 120 125

Glu Lys His Pro Thr His Phe Leu Arg Glu Lys Leu Glu Gln Arg Leu  
130 135 140

Phe Thr Leu Phe Ile Asn Thr Glu Asp Leu Glu Gly Leu Val Gly Tyr  
145 150 155 160

Ala Gln Arg Val Lys Pro Lys Gly Leu Glu Ala Gln Leu Ala Val Leu  
165 170 175

Asn Ala Glu Tyr Gln Leu Gly Arg Lys Arg Ala Glu Ser Asp Lys Asn  
180 185 190

Pro Asn Ala Asn Val Ser Lys Ile Ile Ala Arg Tyr Glu Gln Leu Trp  
195 200 205

Leu Asn Asn Ser Glu Leu Pro Asn Asp Ala Gln Leu Arg Ala Lys Trp  
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Tyr Ser Asp Gly Gly Arg Met Ala Glu Lys Val Tyr Gln Lys Ala Glu  
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Asn Leu Phe Ile Lys Asn Asn Val Lys Gly Leu Glu Leu  
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 1 5 10 15

tcc gat ccg tcc ggt tta ggt tgt act ctt ggt tgg ggc ttt gca tgg 96  
 Ser Asp Pro Ser Gly Leu Gly Cys Thr Leu Gly Trp Gly Phe Ala Trp  
 20 25 30

cca gca aac cgc cgc gtg ctt tat agc cgc gcc tct ttg gat att aac 144  
 Pro Ala Asn Arg Arg Val Leu Tyr Ser Arg Ala Ser Leu Asp Ile Asn  
 35 40 45

ggt aat cct tgg gat aaa cac cgt caa ctg atc aaa tgg aac ggt aaa 192  
 Gly Asn Pro Trp Asp Lys His Arg Gln Leu Ile Lys Trp Asn Gly Lys  
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Pro Ile Glu Ser Pro Ile Asp Thr Asn Pro Leu His Pro Asn Val Val
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Ser Asp Pro Thr Val Arg Ile Tyr Lys Glu Asp Arg Glu Phe Ile Gly  
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His Phe His Ser Trp Thr Ala Gln Ser Ala Ile Asn Ile Ile Ala Gln  
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tgg gat gac tgg tcg gaa gac gat gaa gaa ggc gtg gaa att atc tat 528  
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His Ala Arg Ala Lys Glu Ile Thr Glu Arg Leu Gly Arg Glu Glu Gly  
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Tyr Tyr Leu Ile Ser Ala Ala Thr Gly Lys Asn Ala Pro Gln Leu Cys  
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Arg Asp Ile Met Asp Phe Leu Glu Ala His Pro Arg Lys Thr Glu Lys  
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Thr Pro Val Glu Asn Glu Glu Val Lys Phe Lys Trp Glu Asp Tyr His  
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 Lys Val Lys Cys Gln Ser Gln Ser Ala Cys Gly Ala Cys Ala Ala Lys  
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ccg gcg tgc ggt aat tct gcc ttg tcg gaa tta gcc agc agc ggc gcg 144  
 Pro Ala Cys Gly Asn Ser Ala Leu Ser Glu Leu Ala Ser Ser Gly Ala  
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cgc ggc gaa cat att ttc acc atc gag acc att acg cca ctg aaa atc 192  
 Arg Gly Glu His Ile Phe Thr Ile Glu Thr Ile Thr Pro Leu Lys Ile  
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ggg caa cgg gtg gaa atc ggt ttg tcc gaa cgt tcc tta atc aaa tcc 240  
 Gly Gln Arg Val Glu Ile Gly Leu Ser Glu Arg Ser Leu Ile Lys Ser  
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 Ala Leu Leu Met Tyr Cys Val Pro Leu Phe Thr Leu Leu Phe Ser Thr  
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tta tta ttt gat tcg ctg ttt gcc cat gag ctc gtc agc gtc ttt ttt 336  
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 100 105 110



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Leu Ala Pro Gly Thr Val Ile Ile Gly Leu Leu Leu Leu Ile Phe His	35	40	45	
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Leu Ala Arg Pro Trp Thr Phe Trp Tyr Leu Met Phe Asn Tyr Gln Phe	50	55	60	
aat tcc gtg atg tcc atg ggg gta ctg tta ttc caa atc tat atg gcg				240
Asn Ser Val Met Ser Met Gly Val Leu Leu Phe Gln Ile Tyr Met Ala	65	70	75	80
gcg gtt ctc ctc tgg att gcg att ctc ttt aaa aat gaa ctt gcc gcc				288
Ala Val Leu Leu Trp Ile Ala Ile Leu Phe Lys Asn Glu Leu Ala Ala	85	90	95	
ttg ctc gat aga ttt tta ccg aaa tta aaa ttt atc gtg aaa tgg att				336
Leu Leu Asp Arg Phe Leu Pro Lys Leu Lys Phe Ile Val Lys Trp Ile	100	105	110	
ttc gcc tgt gaa cgc att acc aac ccg ttg gaa ctg ttc ctg ttg ttc				384
Phe Ala Cys Glu Arg Ile Thr Asn Pro Leu Glu Leu Phe Leu Leu Phe	115	120	125	
ctt gcg gtg ttg cta ggc gct tat acc ggt ttc tta ttg tcg gcg tta				432
Leu Ala Val Leu Leu Gly Ala Tyr Thr Gly Phe Leu Leu Ser Ala Leu	130	135	140	
atc agc tac ccg atg cta aac aat ccc gta ttg ccg gca tta ttc ctc				480
Ile Ser Tyr Pro Met Leu Asn Asn Pro Val Leu Pro Ala Leu Phe Leu	145	150	155	160
gct tcg ggc acg tct tcc ggt atc gcg gcg gta ttc tta acc atc ctg				528
Ala Ser Gly Thr Ser Ser Gly Ile Ala Ala Val Phe Leu Thr Ile Leu	165	170	175	
att gtg ggc aaa tta aaa ggg cat tcc gac gaa gtg aat ttc atg cat				576
Ile Val Gly Lys Leu Lys Gly His Ser Asp Glu Val Asn Phe Met His	180	185	190	
aaa ttt gaa gtg ccg atc atg ctc gcc gaa ctc ttt tgc atc ggc tgc				624
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Asn Ser Val Met Ser Met Gly Val Leu Leu Phe Gln Ile Tyr Met Ala  
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Ala Val Leu Leu Trp Ile Ala Ile Leu Phe Lys Asn Glu Leu Ala Ala  
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Phe Ala Cys Glu Arg Ile Thr Asn Pro Leu Glu Leu Phe Leu Leu Phe  
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Leu Ala Val Leu Leu Gly Ala Tyr Thr Gly Phe Leu Leu Ser Ala Leu  
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Ile Ser Tyr Pro Met Leu Asn Asn Pro Val Leu Pro Ala Leu Phe Leu  
 145 150 155 160

Ala Ser Gly Thr Ser Ser Gly Ile Ala Ala Val Phe Leu Thr Ile Leu  
 165 170 175

Ile Val Gly Lys Leu Lys Gly His Ser Asp Glu Val Asn Phe Met His  
 180 185 190

Lys Phe Glu Val Pro Ile Met Leu Ala Glu Leu Phe Cys Ile Gly Cys  
 195 200 205

Phe

<210> 87  
<211> 266  
<212> DNA  
<213> Actinobacillus actinomycetemcomitans

<220>  
<221> CDS  
<222> (1)..(264)

<400> 87  
tgg gat gcc att gag aaa tgt att cag gaa tgg caa ccg gcg cgt att 48  
Trp Asp Ala Ile Glu Lys Cys Ile Gln Glu Trp Gln Pro Ala Arg Ile  
1 5 10 15  
gtg gtc ggt ttg cca ctg aat atg gat ggt acg gaa cag ccc tta acg 96  
Val Val Gly Leu Pro Leu Asn Met Asp Gly Thr Glu Gln Pro Leu Thr  
20 25 30  
ttg cgt gcc aaa aag ttt gct aag cgt ttg cac gga cgt ttt aac gtg 144  
Leu Arg Ala Lys Lys Phe Ala Lys Arg Leu His Gly Arg Phe Asn Val  
35 40 45  
ccg gtg gat tta cag gac gaa cgt ctt acc acc acc gaa gcg cgt agc 192  
Pro Val Asp Leu Gln Asp Glu Arg Leu Thr Thr Thr Glu Ala Arg Ser  
50 55 60  
gaa att ttc agt cgt ggt ggt tat cgc gcc tta aat aaa agc aaa gtg 240  
Glu Ile Phe Ser Arg Gly Gly Tyr Arg Ala Leu Asn Lys Ser Lys Val  
65 70 75 80  
gac ggc att tcc gcc tgt ttg att tt 266  
Asp Gly Ile Ser Ala Cys Leu Ile  
85

<210> 88  
<211> 88  
<212> PRT  
<213> Actinobacillus actinomycetemcomitans

<400> 88  
Trp Asp Ala Ile Glu Lys Cys Ile Gln Glu Trp Gln Pro Ala Arg Ile  
1 5 10 15  
Val Val Gly Leu Pro Leu Asn Met Asp Gly Thr Glu Gln Pro Leu Thr  
20 25 30  
Leu Arg Ala Lys Lys Phe Ala Lys Arg Leu His Gly Arg Phe Asn Val  
35 40 45

Pro Val Asp Leu Gln Asp Glu Arg Leu Thr Thr Thr Glu Ala Arg Ser  
50 55 60

Glu Ile Phe Ser Arg Gly Gly Tyr Arg Ala Leu Asn Lys Ser Lys Val  
65 70 75 80

Asp Gly Ile Ser Ala Cys Leu Ile  
85

<210> 89  
<211> 567  
<212> DNA  
<213> Actinobacillus actinomycetemcomitans

<220>  
<221> CDS  
<222> (1)..(567)

<400> 89  
caa caa gta aaa gcg ccg gga gaa gcc aaa tcc gac gta tgg caa ttg 48  
Gln Gln Val Lys Ala Pro Gly Glu Ala Lys Ser Asp Val Trp Gln Leu  
1 5 10 15

gta gaa ttc tcc aaa tat ttc acc acc gat gaa atg tgg ccg gcg gaa 96  
Val Glu Phe Ser Lys Tyr Phe Thr Thr Asp Glu Met Trp Pro Ala Glu  
20 25 30

att ctg gac aaa aat ccg gaa tac aaa ggc aaa acc tta tat gac gtg 144  
Ile Leu Asp Lys Asn Pro Glu Tyr Lys Gly Lys Thr Leu Tyr Asp Val  
35 40 45

tta tac cgc aac ggt caa gta gat aaa ttc ccg tta agc gaa ttg gcg 192  
Leu Tyr Arg Asn Gly Gln Val Asp Lys Phe Pro Leu Ser Glu Leu Ala  
50 55 60

gaa gga caa ttg aat gat gag tcc tat cac ttc ggt ttc tac ttg caa 240  
Glu Gly Gln Leu Asn Asp Glu Ser Tyr His Phe Gly Phe Tyr Leu Gln  
65 70 75 80

aaa ggc tta ttt gag gaa tac gcc tcc ttc ggt cgc ggt cac gga cat 288  
Lys Gly Leu Phe Glu Glu Tyr Ala Ser Phe Gly Arg Gly His Gly His  
85 90 95

gac ttg gca tcg ttc gat act tac cac aaa gca cgc ggt tta cgc tgg 336  
Asp Leu Ala Ser Phe Asp Thr Tyr His Lys Ala Arg Gly Leu Arg Trp  
100 105 110

ccg gtg gtg gac ggc aaa gaa acc tta tgg cgt tat cgc gaa ggc tac 384  
Pro Val Val Asp Gly Lys Glu Thr Leu Trp Arg Tyr Arg Glu Gly Tyr  
115 120 125

gac ccg tat gtc aaa gaa ggg gaa ggt gtg gcg ttc tac ggc tat ccg 432  
Asp Pro Tyr Val Lys Glu Gly Glu Gly Val Ala Phe Tyr Gly Tyr Pro

130	135	140	
gat aaa aaa gcg att att ctt gcc gtg cct tat gag ccg cct gcg gaa			480
Asp Lys Lys Ala Ile Ile Leu Ala Val Pro Tyr Glu Pro Pro Ala Glu			
145	150	155	160
tca ccg gac gaa gaa tac gat ttg tgg tta tgt acc ggt cgc gtg ttg			528
Ser Pro Asp Glu Glu Tyr Asp Leu Trp Leu Cys Thr Gly Arg Val Leu			
	165	170	175
gaa cac tgg cac acc gcc acc atg acc cgt cgt gta cca			567
Glu His Trp His Thr Gly Thr Met Thr Arg Arg Val Pro			
	180	185	

<210> 90  
 <211> 189  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 90

Gln Gln Val Lys Ala Pro Gly Glu Ala Lys Ser Asp Val Trp Gln Leu
1 5 10 15

Val Glu Phe Ser Lys Tyr Phe Thr Thr Asp Glu Met Trp Pro Ala Glu
20 25 30

Ile Leu Asp Lys Asn Pro Glu Tyr Lys Gly Lys Thr Leu Tyr Asp Val
35 40 45

Leu Tyr Arg Asn Gly Gln Val Asp Lys Phe Pro Leu Ser Glu Leu Ala
50 55 60

Glu Gly Gln Leu Asn Asp Glu Ser Tyr His Phe Gly Phe Tyr Leu Gln
65 70 75 80

Lys Gly Leu Phe Glu Glu Tyr Ala Ser Phe Gly Arg Gly His Gly His
85 90 95

Asp Leu Ala Ser Phe Asp Thr Tyr His Lys Ala Arg Gly Leu Arg Trp
100 105 110

Pro Val Val Asp Gly Lys Glu Thr Leu Trp Arg Tyr Arg Glu Gly Tyr
115 120 125

Asp Pro Tyr Val Lys Glu Gly Glu Gly Val Ala Phe Tyr Gly Tyr Pro
130 135 140

Asp Lys Lys Ala Ile Ile Leu Ala Val Pro Tyr Glu Pro Pro Ala Glu  
 145 150 155 160

Ser Pro Asp Glu Glu Tyr Asp Leu Trp Leu Cys Thr Gly Arg Val Leu  
 165 170 175

Glu His Trp His Thr Gly Thr Met Thr Arg Arg Val Pro  
 180 185

<210> 91  
 <211> 563  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans  
 <220>  
 <221> CDS  
 <222> (1)..(561)

<400> 91  
 ccg aaa cct ttc tat ttt tcc gct gaa aaa gat ggc att ggt gta gaa 48  
 Pro Lys Pro Phe Tyr Phe Ser Ala Glu Lys Asp Gly Ile Gly Val Glu  
 1 5 10 15  
 att gcg ttg caa tgg aac gac ggt tac gcg gaa aac att tat tgt ttc 96  
 Ile Ala Leu Gln Trp Asn Asp Gly Tyr Ala Glu Asn Ile Tyr Cys Phe  
 20 25 30  
 acc aac aac att ccg caa cgg gac ggc ggt acg cac tta gcc ggt ttc 144  
 Thr Asn Asn Ile Pro Gln Arg Asp Gly Gly Thr His Leu Ala Gly Phe  
 35 40 45  
 cgt ggc gca atg acc cgc acc ttg aac aac tac atg gaa aac gaa ggc 192  
 Arg Gly Ala Met Thr Arg Thr Leu Asn Asn Tyr Met Glu Asn Glu Gly  
 50 55 60  
 tac acc aag aaa tcc aaa gtg gcg act tcc ggt gat gat gcc cgt gaa 240  
 Tyr Thr Lys Lys Ser Lys Val Ala Thr Ser Gly Asp Asp Ala Arg Glu  
 65 70 75 80  
 ggc ttg gtg gcg gtg att tcc gtg aaa gta ccg gat ccg aaa ttc tct 288  
 Gly Leu Val Ala Val Ile Ser Val Lys Val Pro Asp Pro Lys Phe Ser  
 85 90 95  
 tct caa aca aaa gac aaa ctg gtt tcc tcc gaa gtg aaa agt gcg gtg 336  
 Ser Gln Thr Lys Asp Lys Leu Val Ser Ser Glu Val Lys Ser Ala Val  
 100 105 110  
 gaa tcc ctg atg aac gaa tat tta caa acc tat ttg ttg gaa aac ccg 384  
 Glu Ser Leu Met Asn Glu Tyr Leu Gln Thr Tyr Leu Leu Glu Asn Pro  
 115 120 125  
 aac gat gta aaa atc atc gtg acc aaa att att gat gcc gcg cgt gcc 432  
 Asn Asp Val Lys Ile Ile Val Thr Lys Ile Ile Asp Ala Ala Arg Ala



130	135	140	
cgt gaa gcc gcc cgc aaa gcc cgc gaa atg acc cgt cgt aaa ggc gcg			480
Arg Glu Ala Ala Arg Lys Ala Arg Glu Met Thr Arg Arg Lys Gly Ala			
145	150	155	160
ttg gat tta ggc ggc ttg ccg ggc aaa ttg gcg gat tgt cag gaa cgc			528
Leu Asp Leu Gly Gly Leu Pro Gly Lys Leu Ala Asp Cys Gln Glu Arg			
	165	170	175
gat ccg gcg tta tcc gag ctt tac atc gtg gag gg			563
Asp Pro Ala Leu Ser Glu Leu Tyr Ile Val Glu			
	180	185	

<210> 92  
 <211> 187  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 92

Pro Lys Pro Phe Tyr Phe Ser Ala Glu Lys Asp Gly Ile Gly Val Glu
1 5 10 15

Ile Ala Leu Gln Trp Asn Asp Gly Tyr Ala Glu Asn Ile Tyr Cys Phe
20 25 30

Thr Asn Asn Ile Pro Gln Arg Asp Gly Gly Thr His Leu Ala Gly Phe
35 40 45

Arg Gly Ala Met Thr Arg Thr Leu Asn Asn Tyr Met Glu Asn Glu Gly
50 55 60

Tyr Thr Lys Lys Ser Lys Val Ala Thr Ser Gly Asp Asp Ala Arg Glu
65 70 75 80

Gly Leu Val Ala Val Ile Ser Val Lys Val Pro Asp Pro Lys Phe Ser
85 90 95

Ser Gln Thr Lys Asp Lys Leu Val Ser Ser Glu Val Lys Ser Ala Val
100 105 110

Glu Ser Leu Met Asn Glu Tyr Leu Gln Thr Tyr Leu Leu Glu Asn Pro
115 120 125

Asn Asp Val Lys Ile Ile Val Thr Lys Ile Ile Asp Ala Ala Arg Ala
130 135 140

Arg Glu Ala Ala Arg Lys Ala Arg Glu Met Thr Arg Arg Lys Gly Ala  
145 150 155 160

Leu Asp Leu Gly Gly Leu Pro Gly Lys Leu Ala Asp Cys Gln Glu Arg  
165 170 175

Asp Pro Ala Leu Ser Glu Leu Tyr Ile Val Glu  
180 185

<210> 93  
<211> 627  
<212> DNA  
<213> Actinobacillus actinomycetemcomitans

<220>  
<221> CDS  
<222> (1)..(627)

<400> 93  
aaa cag caa tta gcc gct gca ctt gcc cga caa gaa caa aaa caa att 48  
Lys Gln Gln Leu Ala Ala Ala Leu Ala Arg Gln Glu Gln Lys Gln Ile  
1 5 10 15  
atc gtt tta caa aaa aag tta acg tct ttg tct tcc cta tcc cca caa 96  
Ile Val Leu Gln Lys Lys Leu Thr Ser Leu Ser Ser Leu Ser Pro Gln  
20 25 30  
cgt ctt gcg caa caa att cgg act acc gaa aaa att ctg acc cgt att 144  
Arg Leu Ala Gln Gln Ile Arg Thr Thr Glu Lys Ile Leu Thr Arg Ile  
35 40 45  
ttt aaa aca gag aaa aat ctg aca ccc aaa ttt att gat tac ctg tat 192  
Phe Lys Thr Glu Lys Asn Leu Thr Pro Lys Phe Ile Asp Tyr Leu Tyr  
50 55 60  
ttt gag cca att gaa acg gct gat gac acc tta atg cag gaa atg aaa 240  
Phe Glu Pro Ile Glu Thr Ala Asp Asp Thr Leu Met Gln Glu Met Lys  
65 70 75 80  
aaa aat ctt ttg atc tct ttc ttg gca aat gaa cgc gct caa atc tat 288  
Lys Asn Leu Leu Ile Ser Phe Leu Ala Asn Glu Arg Ala Gln Ile Tyr  
85 90 95  
att aaa gac atg cca aac gct aat caa ttt gtt cag ctt tta aca gaa 336  
Ile Lys Asp Met Pro Asn Ala Asn Gln Phe Val Gln Leu Leu Thr Glu  
100 105 110  
aaa gga gca aag act acg caa ata tcc gta ttg gca gaa cct gct aaa 384  
Lys Gly Ala Lys Thr Thr Gln Ile Ser Val Leu Ala Glu Pro Ala Lys  
115 120 125  
acc att ttc cag cga atc cgc gaa caa atg tac caa gat ttt cct aat 432  
Thr Ile Phe Gln Arg Ile Arg Glu Gln Met Tyr Gln Asp Phe Pro Asn

130	135	140	
aaa aaa cag ttt act atc act gaa aat cga gta agt gtt att gcc cct			480
Lys Lys Gln Phe Thr Ile Thr Glu Asn Arg Val Ser Val Ile Ala Pro			
145	150	155	160
tcc tcc gtt att aag cca cgc ctt gcc ttg gca gct gca att ttt gat			528
Ser Ser Val Ile Lys Pro Arg Leu Ala Leu Ala Ala Ile Phe Asp			
	165	170	175
cag cag ttt aaa ggg gtt gaa gtt gat gat ttt tct tac ttg gat caa			576
Gln Gln Phe Lys Gly Val Glu Val Asp Asp Phe Ser Tyr Leu Asp Gln			
	180	185	190
ccg cgt gaa aat ttg caa cac aat aat gat aca acc cgt tat aaa acc			624
Pro Arg Glu Asn Leu Gln His Asn Asn Asp Thr Thr Arg Tyr Lys Thr			
	195	200	205
ttt			627
Phe			
<210> 94			
<211> 209			
<212> PRT			
<213> Actinobacillus actinomycetemcomitans			
<400> 94			
Lys Gln Gln Leu Ala Ala Ala Leu Ala Arg Gln Glu Gln Lys Gln Ile			
1	5	10	15
Ile Val Leu Gln Lys Lys Leu Thr Ser Leu Ser Ser Leu Ser Pro Gln			
	20	25	30
Arg Leu Ala Gln Gln Ile Arg Thr Thr Glu Lys Ile Leu Thr Arg Ile			
	35	40	45
Phe Lys Thr Glu Lys Asn Leu Thr Pro Lys Phe Ile Asp Tyr Leu Tyr			
	50	55	60
Phe Glu Pro Ile Glu Thr Ala Asp Asp Thr Leu Met Gln Glu Met Lys			
65	70	75	80
Lys Asn Leu Leu Ile Ser Phe Leu Ala Asn Glu Arg Ala Gln Ile Tyr			
	85	90	95
Ile Lys Asp Met Pro Asn Ala Asn Gln Phe Val Gln Leu Leu Thr Glu			
	100	105	110

Lys Gly Ala Lys Thr Thr Gln Ile Ser Val Leu Ala Glu Pro Ala Lys  
 115 120 125

Thr Ile Phe Gln Arg Ile Arg Glu Gln Met Tyr Gln Asp Phe Pro Asn  
 130 135 140

Lys Lys Gln Phe Thr Ile Thr Glu Asn Arg Val Ser Val Ile Ala Pro  
 145 150 155 160

Ser Ser Val Ile Lys Pro Arg Leu Ala Leu Ala Ala Ala Ile Phe Asp  
 165 170 175

Gln Gln Phe Lys Gly Val Glu Val Asp Asp Phe Ser Tyr Leu Asp Gln  
 180 185 190

Pro Arg Glu Asn Leu Gln His Asn Asn Asp Thr Thr Arg Tyr Lys Thr  
 195 200 205

Phe

<210> 95  
 <211> 270  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1)..(270)

<400> 95  
 tct gac aat acg caa tat ttt tgc ccg gcg gga tta agc gag gag cgt 48  
 Ser Asp Asn Thr Gln Tyr Phe Cys Pro Ala Gly Leu Ser Glu Glu Arg  
 1 5 10 15

gaa cag gag ctc cgc cgt ttg gta aaa cag gcc tat gat gtg gtg ggc 96  
 Glu Gln Glu Leu Arg Arg Leu Val Lys Gln Ala Tyr Asp Val Val Gly  
 20 25 30

tgt cgt ggt tgg agc cgt att gat gtg atg gcg gat gcg gaa gga aag 144  
 Cys Arg Gly Trp Ser Arg Ile Asp Val Met Ala Asp Ala Glu Gly Lys  
 35 40 45

ttc cgt ttg gtg gaa gtt aat acc aac cct ggc atg acc agc cac agt 192  
 Phe Arg Leu Val Glu Val Asn Thr Asn Pro Gly Met Thr Ser His Ser  
 50 55 60

tta ttc ccg aaa tcg gcg gca acg gtc ggc tat tct ttt gcg cag ttg 240  
 Leu Phe Pro Lys Ser Ala Ala Thr Val Gly Tyr Ser Phe Ala Gln Leu

65	70	75	80	
gtt gag aaa att tta gag ttg agc gcg gaa				270
Val Glu Lys Ile	Leu Glu Leu Ser Ala Glu			
	85	90		
<210> 96				
<211> 90				
<212> PRT				
<213> Actinobacillus actinomycetemcomitans				
<400> 96				
Ser Asp Asn Thr	Gln Tyr Phe Cys Pro Ala Gly	Leu Ser Glu Glu Arg		
1	5	10	15	
Glu Gln Glu Leu Arg Arg Leu Val Lys Gln Ala Tyr Asp Val Val Gly				
	20	25	30	
Cys Arg Gly Trp Ser Arg Ile Asp Val Met Ala Asp Ala Glu Gly Lys				
	35	40	45	
Phe Arg Leu Val Glu Val Asn Thr Asn Pro Gly Met Thr Ser His Ser				
	50	55	60	
Leu Phe Pro Lys Ser Ala Ala Thr Val Gly Tyr Ser Phe Ala Gln Leu				
65	70	75	80	
Val Glu Lys Ile Leu Glu Leu Ser Ala Glu				
	85	90		
<210> 97				
<211> 379				
<212> DNA				
<213> Actinobacillus actinomycetemcomitans				
<220>				
<221> CDS				
<222> (1)..(378)				
<400> 97				
ggg gaa tat ttc	ggt cct tat ccg aat gcc ggt gca gtg	cgc gaa acc		48
Gly Glu Tyr Phe	Gly Pro Tyr Pro Asn Ala Gly Ala Val Arg	Glu Thr		
1	5	10	15	
ctg tct tta tta caa aaa ctg ttc ccc att cgg cag tgt gaa aac tcc				
Leu Ser Leu Leu	Gln Lys Leu Phe Pro Ile Arg Gln Cys	Glu Asn Ser		96
	20	25	30	
gtg tat aac aac cgt tcg cgc ccc tgt ttg cag tat caa atc ggg cgt				
				144

Val	Tyr	Asn	Asn	Arg	Ser	Arg	Pro	Cys	Leu	Gln	Tyr	Gln	Ile	Gly	Arg		
		35					40					45					
tgt	ctg	gcg	cct	tgc	gta	aag	ggc	tat	gtg	acc	gat	gaa	gcc	tat	gcg		192
Cys	Leu	Ala	Pro	Cys	Val	Lys	Gly	Tyr	Val	Thr	Asp	Glu	Ala	Tyr	Ala		
		50				55					60						
cag	cag	gtc	aat	ttc	gcc	cgc	ttg	ttt	tta	caa	gga	aaa	gat	caa	cag		240
Gln	Gln	Val	Asn	Phe	Ala	Arg	Leu	Phe	Leu	Gln	Gly	Lys	Asp	Gln	Gln		
		65			70				75						80		
gtg	ctg	gat	cat	ttg	gtg	aag	caa	atg	gaa	cag	gca	agt	cag	caa	ctg		288
Val	Leu	Asp	His	Leu	Val	Lys	Gln	Met	Glu	Gln	Ala	Ser	Gln	Gln	Leu		
			85					90						95			
aat	ttt	gaa	gaa	gcg	gca	cgc	gtt	cgt	gat	caa	att	cag	gca	gtg	cgg		336
Asn	Phe	Glu	Glu	Ala	Ala	Arg	Val	Arg	Asp	Gln	Ile	Gln	Ala	Val	Arg		
			100					105					110				
gca	gta	att	gaa	aaa	caa	ttt	gtc	gcc	aac	gat	cgc	cat	gac	g			379
Ala	Val	Ile	Glu	Lys	Gln	Phe	Val	Ala	Asn	Asp	Arg	His	Asp				
		115				120						125					

<210> 98  
 <211> 126  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans  
 <400> 98

Gly	Glu	Tyr	Phe	Gly	Pro	Tyr	Pro	Asn	Ala	Gly	Ala	Val	Arg	Glu	Thr		
1				5					10					15			

Leu	Ser	Leu	Leu	Gln	Lys	Leu	Phe	Pro	Ile	Arg	Gln	Cys	Glu	Asn	Ser		
		20						25					30				

Val	Tyr	Asn	Asn	Arg	Ser	Arg	Pro	Cys	Leu	Gln	Tyr	Gln	Ile	Gly	Arg		
		35					40					45					

Cys	Leu	Ala	Pro	Cys	Val	Lys	Gly	Tyr	Val	Thr	Asp	Glu	Ala	Tyr	Ala		
	50					55					60						

Gln	Gln	Val	Asn	Phe	Ala	Arg	Leu	Phe	Leu	Gln	Gly	Lys	Asp	Gln	Gln		
	65				70				75						80		

Val	Leu	Asp	His	Leu	Val	Lys	Gln	Met	Glu	Gln	Ala	Ser	Gln	Gln	Leu		
			85					90						95			

Asn	Phe	Glu	Glu	Ala	Ala	Arg	Val	Arg	Asp	Gln	Ile	Gln	Ala	Val	Arg		
			100					105					110				

Ala Val Ile Glu Lys Gln Phe Val Ala Asn Asp Arg His Asp  
 115 120 125

<210> 99  
 <211> 625  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1)..(624)

<400> 99  
 gca aaa acc tta gat ttt cag tcc gca ggg ccg gaa aaa ctc ccg aaa 48  
 Ala Lys Thr Leu Asp Phe Gln Ser Ala Gly Pro Glu Lys Leu Pro Lys  
 1 5 10 15  
 ttt caa ccg cac ttt ttg gcg caa agc caa caa tta atc gac att tgc 96  
 Phe Gln Pro His Phe Leu Ala Gln Ser Gln Gln Leu Ile Asp Ile Cys  
 20 25 30  
 cgc cgc ctg aca ccg gcg gat att gct tcg ctc atg tct atc agc gac 144  
 Arg Arg Leu Thr Pro Ala Asp Ile Ala Ser Leu Met Ser Ile Ser Asp  
 35 40 45  
 aaa ctt gcc ggg ttg aat gcc gca cgt ttc gcc gaa tgg cag ttg gaa 192  
 Lys Leu Ala Gly Leu Asn Ala Ala Arg Phe Ala Glu Trp Gln Leu Glu  
 50 55 60  
 cat aac gaa cac aat gcc aaa gcg gcg gtg tat gcc ttt aga ggc gat 240  
 His Asn Glu His Asn Ala Lys Ala Ala Val Tyr Ala Phe Arg Gly Asp  
 65 70 75 80  
 gtt tac acc ggc ttg gac gtg gat tcc tta agc aat gac gat atg ttg 288  
 Val Tyr Thr Gly Leu Asp Val Asp Ser Leu Ser Asn Asp Asp Met Leu  
 85 90 95  
 ttt gca caa cag cat ttg cgc att ttg tcc ggg tta tat ggg ctg tta 336  
 Phe Ala Gln Gln His Leu Arg Ile Leu Ser Gly Leu Tyr Gly Leu Leu  
 100 105 110  
 acg ccg ctg gat ttg att cag cct tat cgt ttg gaa atg ggc acc aaa 384  
 Thr Pro Leu Asp Leu Ile Gln Pro Tyr Arg Leu Glu Met Gly Thr Lys  
 115 120 125  
 tta gcc aac ggc aaa ggc gcc gat ttg tat gcc ttt tgg cat ggt ttg 432  
 Leu Ala Asn Gly Lys Gly Ala Asp Leu Tyr Ala Phe Trp His Gly Leu  
 130 135 140  
 gtg atg cag gcg tta caa cag gcg att gat gaa caa cag gac gat gtt 480  
 Val Met Gln Ala Leu Gln Gln Ala Ile Asp Glu Gln Gln Asp Asp Val  
 145 150 155 160  
 ttg gtg aat ctg gcg tcc gat gaa tat tat aaa tcg gta caa ccg tcg 528

Leu Val Asn Leu Ala Ser Asp Glu Tyr Tyr Lys Ser Val Gln Pro Ser  
 165 170 175  
 aat tta acg gcg caa atc att aaa ccg gtg ttc ctg gat aat aaa aac 576  
 Asn Leu Thr Ala Gln Ile Ile Lys Pro Val Phe Leu Asp Asn Lys Asn  
 180 185 190  
 ggc aaa tat aaa att atc agt ttc tac gcg aaa aaa gcc cgc ggt tta a 625  
 Gly Lys Tyr Lys Ile Ile Ser Phe Tyr Ala Lys Lys Ala Arg Gly Leu  
 195 200 205

<210> 100  
 <211> 208  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 100

Ala Lys Thr Leu Asp Phe Gln Ser Ala Gly Pro Glu Lys Leu Pro Lys  
 1 5 10 15

Phe Gln Pro His Phe Leu Ala Gln Ser Gln Gln Leu Ile Asp Ile Cys  
 20 25 30

Arg Arg Leu Thr Pro Ala Asp Ile Ala Ser Leu Met Ser Ile Ser Asp  
 35 40 45

Lys Leu Ala Gly Leu Asn Ala Ala Arg Phe Ala Glu Trp Gln Leu Glu  
 50 55 60

His Asn Glu His Asn Ala Lys Ala Ala Val Tyr Ala Phe Arg Gly Asp  
 65 70 75 80

Val Tyr Thr Gly Leu Asp Val Asp Ser Leu Ser Asn Asp Asp Met Leu  
 85 90 95

Phe Ala Gln Gln His Leu Arg Ile Leu Ser Gly Leu Tyr Gly Leu Leu  
 100 105 110

Thr Pro Leu Asp Leu Ile Gln Pro Tyr Arg Leu Glu Met Gly Thr Lys  
 115 120 125

Leu Ala Asn Gly Lys Gly Ala Asp Leu Tyr Ala Phe Trp His Gly Leu  
 130 135 140

Val Met Gln Ala Leu Gln Gln Ala Ile Asp Glu Gln Gln Asp Asp Val  
 145 150 155 160



Leu Val Asn Leu Ala Ser Asp Glu Tyr Tyr Lys Ser Val Gln Pro Ser  
165 170 175

Asn Leu Thr Ala Gln Ile Ile Lys Pro Val Phe Leu Asp Asn Lys Asn  
180 185 190

Gly Lys Tyr Lys Ile Ile Ser Phe Tyr Ala Lys Lys Ala Arg Gly Leu  
195 200 205

<210> 101  
<211> 500  
<212> DNA  
<213> Actinobacillus actinomycetemcomitans

<220>  
<221> CDS  
<222> (1)..(498)

<400> 101  
cac tgc ttt ata ccg cca tcg cta tgg ctt gct tac ccg cgt atg ccg 48  
His Cys Phe Ile Pro Pro Ser Leu Trp Leu Ala Tyr Arg Arg Met Pro  
1 5 10 15

aag aag ttt tta ccc ttg ggc aaa ttg agg tga ttg ccg ata gat caa 96  
Lys Lys Phe Leu Pro Leu Gly Lys Leu Arg Leu Pro Ile Asp Gln  
20 25 30

ccg att taa gca cca cac gca ttg aac agg ctg act tac aga aaa aca 144  
Arg Ile Ala Pro His Ala Leu Asn Arg Leu Thr Tyr Arg Lys Thr  
35 40 45

atc aaa cca atg tcg ccg agg tgg cga aaa cca cac ccg gcg tat ttt 192  
Ile Lys Pro Met Ser Pro Arg Trp Arg Lys Pro His Arg Ala Tyr Phe  
50 55 60

tgg atc gta gcg gcg cac gca atg aac ata att tgt tgg tac gcg gat 240  
Trp Ile Val Ala Ala His Ala Met Asn Ile Ile Cys Trp Tyr Ala Asp  
65 70 75

tta aag cca atc gcg tgc cag tgt tta ttg acg gca ttc ccg tgt atg 288  
Leu Lys Pro Ile Ala Cys Gln Cys Leu Leu Thr Ala Phe Arg Cys Met  
80 85 90

tgc cct atg acg gca ata tgg aca ttg gtc gct tca cca cct tcg att 336  
Cys Pro Met Thr Ala Ile Trp Thr Leu Val Ala Ser Pro Pro Ser Ile  
95 100 105 110

tat ccc gca ttg ata ttt cca agg gcg caa gtt ccg tgc ttt atg gcg 384  
Tyr Pro Ala Leu Ile Phe Pro Arg Ala Gln Val Pro Cys Phe Met Ala  
115 120 125

cca aca cgc tgg gcg gtg ccg taa atc tca tta cgc aaa aac cga cca 432

[illegible]

Ile Ala Cys Gln Cys Leu Leu Thr Ala Phe Arg Cys Met Cys Pro Met  
 50 55 60

Thr Ala Ile Trp Thr Leu Val Ala Ser Pro Pro Ser Ile Tyr Pro Ala  
 65 70 75 80

Leu Ile Phe Pro Arg Ala Gln Val Pro Cys Phe Met Ala Pro Thr Arg  
 85 90 95

Trp Ala Val Arg  
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<210> 105  
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 <213> Actinobacillus actinomycetemcomitans

<400> 105

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Thr Asp Leu Leu Thr Val Glu Ala Ala Ala Arg Ala Pro Ile  
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<220>  
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<400> 106

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 Ala Phe Phe Ser Leu Phe Ser Ile Ile Met Ser Gly Arg Leu Lys Glu  
 1 5 10 15

ttg ggc gaa cac tta aac gaa acc ggc tct ttc aaa gtg ggc atg att 96  
 Leu Gly Glu His Leu Asn Glu Thr Gly Ser Phe Lys Val Gly Met Ile  
 20 25 30

tgg aaa gct ttt atc gtc atc acc acc ggt gta ctg gct ttc atg cta 144  
 Trp Lys Ala Phe Ile Val Ile Thr Thr Gly Val Leu Ala Phe Met Leu  
 35 40 45

tac aaa gaa gca ggc aaa gtg ctc acc aaa ggc tac gaa ggc tat ccg 192  
 Tyr Lys Glu Ala Gly Lys Val Leu Thr Lys Gly Tyr Glu Gly Tyr Pro  
 50 55 60

gac cgg ttc gtc aac acc ttc ggc tgg ggc atg gca atc gct ttg gtg 240  
 Asp Arg Phe Val Asn Thr Phe Gly Trp Gly Met Ala Ile Ala Leu Val  
 65 70 75 80

atc atc gca ttc ctg ctt tcc cgc ctg ccg tgg aaa cac tta acg caa 288  
 Ile Ile Ala Phe Leu Leu Ser Arg Leu Pro Trp Lys His Leu Thr Gln  
 85 90 95

aca caa gga gaa aaa 303  
 Thr Gln Gly Glu Lys  
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<210> 107  
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<400> 107

Ala Phe Phe Ser Leu Phe Ser Ile Ile Met Ser Gly Arg Leu Lys Glu  
 1 5 10 15

Leu Gly Glu His Leu Asn Glu Thr Gly Ser Phe Lys Val Gly Met Ile  
 20 25 30

Trp Lys Ala Phe Ile Val Ile Thr Thr Gly Val Leu Ala Phe Met Leu  
 35 40 45

Tyr Lys Glu Ala Gly Lys Val Leu Thr Lys Gly Tyr Glu Gly Tyr Pro  
 50 55 60

Asp Arg Phe Val Asn Thr Phe Gly Trp Gly Met Ala Ile Ala Leu Val  
 65 70 75 80

Ile Ile Ala Phe Leu Leu Ser Arg Leu Pro Trp Lys His Leu Thr Gln  
 85 90 95

Thr Gln Gly Glu Lys  
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Val Phe Ile Thr Ala Cys Asn Asn Ile Asn Phe Pro Arg Ser Val Ser  
1 5 10 15

gga ggc ttc agg ttt acg aac ttt gac tac act aaa cag aga acg gat 96  
Gly Gly Phe Arg Phe Thr Asn Phe Asp Tyr Thr Lys Gln Arg Thr Asp  
20 25 30

ctc ttt taa gta ttc atc aaa acc ttc ccc ctg aaa aac ttt tac tac 144  
Leu Phe Val Phe Ile Lys Thr Phe Pro Leu Lys Asn Phe Tyr Tyr  
35 40 45

aaa act tcc ttt att agc gag aat ctg ctt gca cat atc aag cgc aag 192  
Lys Thr Ser Phe Ile Ser Glu Asn Leu Leu Ala His Ile Lys Arg Lys  
50 55 60

ttc tac caa ata cat cgc acg cgg aat atc cac tga tgg cat ccc act 240  
Phe Tyr Gln Ile His Arg Thr Arg Asn Ile His Trp His Pro Thr  
65 70 75

gaa att cgg tgc cat atc tga cat cac cac atc tac ttt gcc ttc acc 288  
Glu Ile Arg Cys His Ile His His His Ile Tyr Phe Ala Phe Thr  
80 85 90

gac ccg ctc caa taa aat gtt taa cac att ttc atc acg gaa atc gcc 336  
Asp Pro Leu Gln Asn Val His Ile Phe Ile Thr Glu Ile Ala  
95 100 105

ttg tag aaa atc cac gcc tac aat agg atc cat ttc cag aag atc aca 384  
Leu Lys Ile His Ala Tyr Asn Arg Ile His Phe Gln Lys Ile Thr  
110 115 120

ggc aat aat ccg tcc att gcg ccc aat ttg gct tac cac ata ctg cga 432  
Gly Asn Asn Pro Ser Ile Ala Pro Asn Leu Ala Tyr His Ile Leu Arg  
125 130 135

cca tcc gcc cgg cgc tgc acc taa atc aac cac 465  
Pro Ser Ala Arg Arg Cys Thr Ile Asn His  
140 145

<210> 109  
<211> 34  
<212> PRT  
<213> Actinobacillus actinomycetemcomitans

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Val Phe Ile Thr Ala Cys Asn Asn Ile Asn Phe Pro Arg Ser Val Ser  
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Gly Gly Phe Arg Phe Thr Asn Phe Asp Tyr Thr Lys Gln Arg Thr Asp  
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Leu Phe

<210> 110  
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Val Phe Ile Lys Thr Phe Pro Leu Lys Asn Phe Tyr Tyr Lys Thr Ser  
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Phe Ile Ser Glu Asn Leu Leu Ala His Ile Lys Arg Lys Phe Tyr Gln  
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Ile His Arg Thr Arg Asn Ile His  
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<211> 10  
<212> PRT  
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Trp His Pro Thr Glu Ile Arg Cys His Ile  
1 5 10

<210> 112  
<211> 13  
<212> PRT  
<213> Actinobacillus actinomycetemcomitans  
  
<400> 112

His His His Ile Tyr Phe Ala Phe Thr Asp Pro Leu Gln  
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<210> 113  
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His Ile Phe Ile Thr Glu Ile Ala Leu  
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<210> 114

<211> 37  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 114

Lys Ile His Ala Tyr Asn Arg Ile His Phe Gln Lys Ile Thr Gly Asn  
 1 5 10 15

Asn Pro Ser Ile Ala Pro Asn Leu Ala Tyr His Ile Leu Arg Pro Ser  
 20 25 30

Ala Arg Arg Cys Thr  
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gaa ctg ggc tgg gga ggt tgg tgg ttc tgg gat ccg gtg gaa aat gcg 48  
 Glu Leu Gly Trp Gly Gly Trp Trp Phe Trp Asp Pro Val Glu Asn Ala  
 1 5 10 15

tcg ctc atg ccg tgg ttg ctc ggc ttg gca ttg ttg cac agt tta atc 96  
 Ser Leu Met Pro Trp Leu Leu Gly Leu Ala Leu Leu His Ser Leu Ile  
 20 25 30

gtc agc gaa aaa cgc gga att ttt aat tac tgg acg acc tta ttt tcc 144  
 Val Ser Glu Lys Arg Gly Ile Phe Asn Tyr Trp Thr Thr Leu Phe Ser  
 35 40 45

ttg ttg gca ttt gcc ttc agc gta tta ggc acg ttt atc gtg cgc tcc 192  
 Leu Leu Ala Phe Ala Phe Ser Val Leu Gly Thr Phe Ile Val Arg Ser  
 50 55 60

ggc gcg ctt acc tcc gta cac gct ttc gct gtg gac agc caa cgc ggc 240  
 Gly Ala Leu Thr Ser Val His Ala Phe Ala Val Asp Ser Gln Arg Gly  
 65 70 75 80

tcg gca tta tta ctg att ttc ttc ctg ctc acc gtg ggt tct ctc ggt 288  
 Ser Ala Leu Leu Leu Ile Phe Phe Leu Leu Thr Val Gly Ser Leu Gly  
 85 90 95

tta ttc gcg ttc aaa gcc aat ttg cag caa cgc cgc gtc aaa tta acg 336  
 Leu Phe Ala Phe Lys Ala Asn Leu Gln Gln Arg Arg Val Lys Leu Thr  
 100 105 110

ctg ctt tcc aaa gaa agt gcg gtg ctt ttt ttg aat gtt tta ttg agt 384

Leu	Leu	Ser	Lys	Glu	Ser	Ala	Val	Leu	Phe	Leu	Asn	Val	Leu	Leu	Ser		
		115					120					125					
atc	gcc	acc	gtt	agc	acc	ttt	ctc	ggc	acc	ttt	tat	ccc	atg	ctg	ttc	432	
Ile	Ala	Thr	Val	Ser	Thr	Phe	Leu	Gly	Thr	Phe	Tyr	Pro	Met	Leu	Phe		
	130					135				140							
caa	gcc	atg	aat	tgg	ggg	tcc	att	tcc	gtc	ggg	gcg	cct	tat	ttc	aac	480	
Gln	Ala	Met	Asn	Trp	Gly	Ser	Ile	Ser	Val	Gly	Ala	Pro	Tyr	Phe	Asn		
145				150					155						160		
agt	att	ttc	ttg	cgc	ctg	ctt	acg	ctg	att	tta	atc	gcc	atg	gtg	ttt	528	
Ser	Ile	Phe	Leu	Pro	Leu	Leu	Thr	Leu	Ile	Leu	Ile	Ala	Met	Val	Phe		
			165					170						175			
tcc	ctc	ggc	ttg	cac	tgg	gcg	aag	gcg	gac	aaa	ggc	att	ttg	ttt	aaa	576	
Ser	Leu	Gly	Leu	His	Trp	Ala	Lys	Ala	Asp	Lys	Gly	Ile	Leu	Phe	Lys		
		180					185						190				
cgc	gcg	gcg	ttg	tta	ctg	cgc	tct	ttg	ttg	atc	gct	tat	ttt	atg	att	624	
Arg	Ala	Ala	Leu	Leu	Leu	Pro	Ser	Leu	Leu	Ile	Ala	Tyr	Phe	Met	Ile		
	195					200					205						
cgt	cag															630	
Arg	Gln																
	210																

<210> 116  
 <211> 210  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 116

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Ser	Leu	Met	Pro	Trp	Leu	Leu	Gly	Leu	Ala	Leu	Leu	His	Ser	Leu	Ile
		20					25					30			

Val	Ser	Glu	Lys	Arg	Gly	Ile	Phe	Asn	Tyr	Trp	Thr	Thr	Leu	Phe	Ser
	35					40						45			

Leu	Leu	Ala	Phe	Ala	Phe	Ser	Val	Leu	Gly	Thr	Phe	Ile	Val	Arg	Ser
50					55					60					

Gly	Ala	Leu	Thr	Ser	Val	His	Ala	Phe	Ala	Val	Asp	Ser	Gln	Arg	Gly
65				70					75					80	

Ser	Ala	Leu	Leu	Leu	Ile	Phe	Phe	Leu	Leu	Thr	Val	Gly	Ser	Leu	Gly
			85					90						95	



Leu Phe Ala Phe Lys Ala Asn Leu Gln Gln Arg Arg Val Lys Leu Thr  
 100 105 110

Leu Leu Ser Lys Glu Ser Ala Val Leu Phe Leu Asn Val Leu Leu Ser  
 115 120 125

Ile Ala Thr Val Ser Thr Phe Leu Gly Thr Phe Tyr Pro Met Leu Phe  
 130 135 140

Gln Ala Met Asn Trp Gly Ser Ile Ser Val Gly Ala Pro Tyr Phe Asn  
 145 150 155 160

Ser Ile Phe Leu Pro Leu Leu Thr Leu Ile Leu Ile Ala Met Val Phe  
 165 170 175

Ser Leu Gly Leu His Trp Ala Lys Ala Asp Lys Gly Ile Leu Phe Lys  
 180 185 190

Arg Ala Ala Leu Leu Leu Pro Ser Leu Leu Ile Ala Tyr Phe Met Ile  
 195 200 205

Arg Gln  
 210

<210> 117  
 <211> 876  
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<400> 117  
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 Thr His Pro Val His Ile Ser Met Gln Tyr Met Ala Asp Glu Val Lys  
 1 5 10 15  
 aaa tta aca aat ggt gaa gtg gtg atc cga att tac cca aat agc cag 96  
 Lys Leu Thr Asn Gly Glu Val Val Ile Arg Ile Tyr Pro Asn Ser Gln  
 20 25 30  
 ctt ggt agc cag cgt gaa tca atg gaa tta ttg caa tcc ggg tca cta 144  
 Leu Gly Ser Gln Arg Glu Ser Met Glu Leu Leu Gln Ser Gly Ser Leu  
 35 40 45  
 gat atg gca aaa tca aac gca agt gaa tta gaa gca ttt gag cca tct 192

Asp	Met	Ala	Lys	Ser	Asn	Ala	Ser	Glu	Leu	Glu	Ala	Phe	Glu	Pro	Ser		
50						55					60						
tat	ggt	gca	tac	aat	att	ccg	tat	ctt	ttc	cat	aat	gtt	gat	cat	tat		240
Tyr	Gly	Ala	Tyr	Asn	Ile	Pro	Tyr	Leu	Phe	His	Asn	Val	Asp	His	Tyr		
65					70					75					80		
tat	cgt	gct	cta	ctt	gat	cct	gaa	gtt	ggg	caa	aaa	att	ctt	gat	tca		288
Tyr	Arg	Ala	Leu	Leu	Asp	Pro	Glu	Val	Gly	Gln	Lys	Ile	Leu	Asp	Ser		
				85					90					95			
tca	aag	ggc	aaa	ggt	ttc	att	ggg	ttg	act	tat	tat	gat	ggt	ggt	gcg		336
Ser	Lys	Gly	Lys	Gly	Phe	Ile	Gly	Leu	Thr	Tyr	Tyr	Asp	Gly	Gly	Ala		
			100					105					110				
cgt	agt	ttc	tat	gcg	ggt	aag	gca	att	aaa	tcg	cct	gcg	gac	ctc	aaa		384
Arg	Ser	Phe	Tyr	Ala	Gly	Lys	Ala	Ile	Lys	Ser	Pro	Ala	Asp	Leu	Lys		
		115					120					125					
ggt	atg	aaa	att	cgc	gtt	caa	cca	agc	cca	acc	gca	gta	gaa	atg	atc		432
Gly	Met	Lys	Ile	Arg	Val	Gln	Pro	Ser	Pro	Thr	Ala	Val	Glu	Met	Ile		
	130					135					140						
aaa	tta	atg	ggt	gct	tct	cca	aca	cct	tta	gct	tat	ggt	gaa	ctc	tat		480
Lys	Leu	Met	Gly	Ala	Ser	Pro	Thr	Pro	Leu	Ala	Tyr	Gly	Glu	Leu	Tyr		
145					150					155					160		
acc	gca	ctc	caa	caa	aaa	gtg	gtt	gat	ggc	gcg	gaa	aat	aac	caa	aca		528
Thr	Ala	Leu	Gln	Gln	Lys	Val	Val	Asp	Gly	Ala	Glu	Asn	Asn	Gln	Thr		
				165					170					175			
gca	tta	acc	tta	tct	cgt	cat	ggt	gaa	gtg	gct	aaa	ttc	ttt	agt	gaa		576
Ala	Leu	Thr	Leu	Ser	Arg	His	Gly	Glu	Val	Ala	Lys	Phe	Phe	Ser	Glu		
			180					185						190			
gat	gaa	cat	act	atg	att	cct	gat	gtg	ctc	gta	att	ggt	caa	aaa	tct		624
Asp	Glu	His	Thr	Met	Ile	Pro	Asp	Val	Leu	Val	Ile	Gly	Gln	Lys	Ser		
		195					200					205					
tgg	gat	aaa	tta	act	cca	gaa	caa	caa	aat	gca	ctt	aaa	aaa	gcc	gct		672
Trp	Asp	Lys	Leu	Thr	Pro	Glu	Gln	Gln	Asn	Ala	Leu	Lys	Lys	Ala	Ala		
	210					215					220						
gat	gat	tca	atg	atg	tat	cac	aaa	gat	tta	tgg	caa	aaa	atg	att	gct		720
Asp	Asp	Ser	Met	Met	Tyr	His	Lys	Asp	Leu	Trp	Gln	Lys	Met	Ile	Ala		
225					230					235					240		
gaa	acc	act	caa	gaa	gct	aaa	gat	aaa	ttg	ggt	gta	gaa	ttt	gtg	aaa		768
Glu	Thr	Thr	Gln	Glu	Ala	Lys	Asp	Lys	Leu	Gly	Val	Glu	Phe	Val	Lys		
				245					250					255			
gta	gat	aaa	caa	cct	ttc	att	gat	gca	aca	aaa	agc	atg	cat	gat	gcg		816
Val	Asp	Lys	Gln	Pro	Phe	Ile	Asp	Ala	Thr	Lys	Ser	Met	His	Asp	Ala		
			260					265					270				
gca	aaa	gcc	aat	cct	ttg	ctt	aaa	gaa	tac	att	gaa	cgt	att	gat	agt		864
Ala	Lys	Ala	Asn	Pro	Leu	Leu	Lys	Glu	Tyr	Ile	Glu	Arg	Ile	Asp	Ser		

275

280

285

876

ttg gca acc aag  
 Leu Ala Thr Lys  
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<210> 118  
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 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 118

Thr His Pro Val His Ile Ser Met Gln Tyr Met Ala Asp Glu Val Lys  
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 35 40 45

Asp Met Ala Lys Ser Asn Ala Ser Glu Leu Glu Ala Phe Glu Pro Ser  
 50 55 60

Tyr Gly Ala Tyr Asn Ile Pro Tyr Leu Phe His Asn Val Asp His Tyr  
 65 70 75 80

Tyr Arg Ala Leu Leu Asp Pro Glu Val Gly Gln Lys Ile Leu Asp Ser  
 85 90 95

Ser Lys Gly Lys Gly Phe Ile Gly Leu Thr Tyr Tyr Asp Gly Gly Ala  
 100 105 110

Arg Ser Phe Tyr Ala Gly Lys Ala Ile Lys Ser Pro Ala Asp Leu Lys  
 115 120 125

Gly Met Lys Ile Arg Val Gln Pro Ser Pro Thr Ala Val Glu Met Ile  
 130 135 140

Lys Leu Met Gly Ala Ser Pro Thr Pro Leu Ala Tyr Gly Glu Leu Tyr  
 145 150 155 160

Thr Ala Leu Gln Gln Lys Val Val Asp Gly Ala Glu Asn Asn Gln Thr  
 165 170 175

Ala Leu Thr Leu Ser Arg His Gly Glu Val Ala Lys Phe Phe Ser Glu  
180 185 190

Asp Glu His Thr Met Ile Pro Asp Val Leu Val Ile Gly Gln Lys Ser  
195 200 205

Trp Asp Lys Leu Thr Pro Glu Gln Gln Asn Ala Leu Lys Lys Ala Ala  
210 215 220

Asp Asp Ser Met Met Tyr His Lys Asp Leu Trp Gln Lys Met Ile Ala  
225 230 235 240

Glu Thr Thr Gln Glu Ala Lys Asp Lys Leu Gly Val Glu Phe Val Lys  
245 250 255

Val Asp Lys Gln Pro Phe Ile Asp Ala Thr Lys Ser Met His Asp Ala  
260 265 270

Ala Lys Ala Asn Pro Leu Leu Lys Glu Tyr Ile Glu Arg Ile Asp Ser  
275 280 285

Leu Ala Thr Lys  
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<211> 303  
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<213> Actinobacillus actinomycetemcomitans

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<222> (1)..(303)

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ccc gtt gcc gtt ttg ccg gca gcc gcc gta tta atg ggg atc ggc tat 96  
Pro Val Ala Val Leu Pro Ala Ala Val Leu Met Gly Ile Gly Tyr  
20 25 30

tgg ctt gac ccg gac ggc tgg ggc gca aac agc caa ctt gcc gcc tta 144  
Trp Leu Asp Pro Asp Gly Trp Gly Ala Asn Ser Gln Leu Ala Ala Leu  
35 40 45

tta atc aag tcc ggc gcg gca atc atc gat aac atg ggc tta tta ttc 192  
Leu Ile Lys Ser Gly Ala Ala Ile Ile Asp Asn Met Gly Leu Leu Phe

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      50              55              60
gcc gtg ggc gta gca ttc ggg ttg tcc aaa gac aag cac ggt tct gct      240
Ala Val Gly Val Ala Phe Gly Leu Ser Lys Asp Lys His Gly Ser Ala
65              70              75              80

gcg ctt tcc ggt tta gtg ggc tat tat gtg gtc act acc cta ctc gcc      288
Ala Leu Ser Gly Leu Val Gly Tyr Tyr Val Val Thr Thr Leu Leu Ala
85              90              95

cct ggc ggc gta gcg      303
Pro Gly Gly Val Ala
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Met Ser Val Leu Ser Tyr Ala Gln Lys Ile Gly Gln Ala Leu Met Val
1              5              10              15

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Pro Val Ala Val Leu Pro Ala Ala Ala Val Leu Met Gly Ile Gly Tyr
20              25              30

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Trp Leu Asp Pro Asp Gly Trp Gly Ala Asn Ser Gln Leu Ala Ala Leu
35              40              45

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Leu Ile Lys Ser Gly Ala Ala Ile Ile Asp Asn Met Gly Leu Leu Phe
50              55              60

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Ala Val Gly Val Ala Phe Gly Leu Ser Lys Asp Lys His Gly Ser Ala
65              70              75              80

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Ala Leu Ser Gly Leu Val Gly Tyr Tyr Val Val Thr Thr Leu Leu Ala
85              90              95

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Pro Gly Gly Val Ala
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Glu Tyr Lys Asn Leu Ala Val Ala Tyr Ile Arg Met Ser Thr Glu His  
1 5 10 15

cag gaa ttt tca ccg gat ata caa cgt cgc ttc att caa aaa tat gct 96  
Gln Glu Phe Ser Pro Asp Ile Gln Arg Arg Phe Ile Gln Lys Tyr Ala  
20 25 30

aag gaa caa ggg ctt ata ctc act agg gaa tac cta gat gag gga agg 144  
Lys Glu Gln Gly Leu Ile Leu Thr Arg Glu Tyr Leu Asp Glu Gly Arg  
35 40 45

agt gga tta agc gca gaa aaa cgt cct cag ttt tta tca ctc att aat 192  
Ser Gly Leu Ser Ala Glu Lys Arg Pro Gln Phe Leu Ser Leu Ile Asn  
50 55 60

ttt gta caa tcc ggt aat gct gat ttt tca cat att ctt gtt tat gac 240  
Phe Val Gln Ser Gly Asn Ala Asp Phe Ser His Ile Leu Val Tyr Asp  
65 70 75 80

att agc cga tgg ggg cgc ttt cta aat att gat gaa tct gca cat tat 288  
Ile Ser Arg Trp Gly Arg Phe Leu Asn Ile Asp Glu Ser Ala His Tyr  
85 90 95

gaa caa att tgt tca aaa atg ggg att aaa gtg cat tac tgt gca gaa 336  
Glu Gln Ile Cys Ser Lys Met Gly Ile Lys Val His Tyr Cys Ala Glu  
100 105 110

cct ttt aag gga aac gac att ggt tct caa att ttt aaa gcg gta aaa 384  
Pro Phe Lys Gly Asn Asp Ile Gly Ser Gln Ile Phe Lys Ala Val Lys  
115 120 125

cgt tgg tct gcc gga gaa tac tgt cgt gag cta ggt gaa aaa gtt ttt 432  
Arg Trp Ser Ala Gly Glu Tyr Cys Arg Glu Leu Gly Glu Lys Val Phe  
130 135 140

aat ggg cag aag aat ttg att gag cgc gga ttt cgt caa ggt gga cca 480  
Asn Gly Gln Lys Asn Leu Ile Glu Arg Gly Phe Arg Gln Gly Gly Pro  
145 150 155 160

gct gga ttt ggg tta aga cgc cta tta tta agt gct gat ggt tcg cca 528  
Ala Gly Phe Gly Leu Arg Arg Leu Leu Leu Ser Ala Asp Gly Ser Pro  
165 170 175

aaa ttt gaa cta aaa acg ggt gac agg aag agt ttg cag tcg gat cgt 576  
Lys Phe Glu Leu Lys Thr Gly Asp Arg Lys Ser Leu Gln Ser Asp Arg  
180 185 190

gtc att ctt att gc 590  
Val Ile Leu Ile  
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<400> 122

Glu Tyr Lys Asn Leu Ala Val Ala Tyr Ile Arg Met Ser Thr Glu His  
 1 5 10 15

Gln Glu Phe Ser Pro Asp Ile Gln Arg Arg Phe Ile Gln Lys Tyr Ala  
 20 25 30

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 35 40 45

Ser Gly Leu Ser Ala Glu Lys Arg Pro Gln Phe Leu Ser Leu Ile Asn  
 50 55 60

Phe Val Gln Ser Gly Asn Ala Asp Phe Ser His Ile Leu Val Tyr Asp  
 65 70 75 80

Ile Ser Arg Trp Gly Arg Phe Leu Asn Ile Asp Glu Ser Ala His Tyr  
 85 90 95

Glu Gln Ile Cys Ser Lys Met Gly Ile Lys Val His Tyr Cys Ala Glu  
 100 105 110

Pro Phe Lys Gly Asn Asp Ile Gly Ser Gln Ile Phe Lys Ala Val Lys  
 115 120 125

Arg Trp Ser Ala Gly Glu Tyr Cys Arg Glu Leu Gly Glu Lys Val Phe  
 130 135 140

Asn Gly Gln Lys Asn Leu Ile Glu Arg Gly Phe Arg Gln Gly Gly Pro  
 145 150 155 160

Ala Gly Phe Gly Leu Arg Arg Leu Leu Leu Ser Ala Asp Gly Ser Pro  
 165 170 175

Lys Phe Glu Leu Lys Thr Gly Asp Arg Lys Ser Leu Gln Ser Asp Arg  
 180 185 190

Val Ile Leu Ile  
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 Phe Leu Thr Lys Asp Lys Ile Lys Gln Ala Ile Gln Ala Gln Gln Gln  
 1 5 10 15  
 gaa ctg tta cta caa gtg atc ccg cag gat tac ttc aat aat gat ctg 96  
 Glu Leu Leu Leu Gln Val Ile Pro Gln Asp Tyr Phe Asn Asn Asp Leu  
 20 25 30  
 acg cag gct tgt tat gca ccg caa gcg ggg aca tta caa gtc gtg gag 144  
 Thr Gln Ala Cys Tyr Ala Pro Gln Ala Gly Thr Leu Gln Val Val Glu  
 35 40 45  
 ata agc aaa ata tgc acg gca aag aaa gac ggc gtg act act gcc tat 192  
 Ile Ser Lys Ile Cys Thr Ala Lys Lys Asp Gly Val Thr Thr Ala Tyr  
 50 55 60  
 gcc ttt gaa agc acg gcg cat gat ggc tat tcc ggc gat att cat att 240  
 Ala Phe Glu Ser Thr Ala His Asp Gly Tyr Ser Gly Asp Ile His Ile  
 65 70 75 80  
 ttg gtg ggc atg aaa cct gat ggc gaa gtg ctt ggc gtg cgc att acg 288  
 Leu Val Gly Met Lys Pro Asp Gly Glu Val Leu Gly Val Arg Ile Thr  
 85 90 95  
 gaa cac cac gaa acc ccg gga tta ggc gat aaa att gaa acc cgc att 336  
 Glu His His Glu Thr Pro Gly Leu Gly Asp Lys Ile Glu Thr Arg Ile  
 100 105 110  
 tcc aac tgg gtt tta agt ttt gat cat cag gtt atc agc aac gaa aat 384  
 Ser Asn Trp Val Leu Ser Phe Asp His Gln Val Ile Ser Asn Glu Asn  
 115 120 125  
 gcc gca gaa tgg gcg gtg aaa aaa gac ggc ggt aaa ttc gat caa ttc 432  
 Ala Ala Glu Trp Ala Val Lys Lys Asp Gly Gly Lys Phe Asp Gln Phe  
 130 135 140  
 gcc ggt gcc acc atc acg ccc cgc gct gtg gtt aac caa gtg aaa cgg 480  
 Ala Gly Ala Thr Ile Thr Pro Arg Ala Val Val Asn Gln Val Lys Arg  
 145 150 155 160  
 gcg gca ttg gct atg ctg gat aat ctg ccg aaa gag aga gaa agt gat 528  
 Ala Ala Leu Ala Met Leu Asp Asn Leu Pro Lys Glu Arg Glu Ser Asp  
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 gga 531  
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Phe Leu Thr Lys Asp Lys Ile Lys Gln Ala Ile Gln Ala Gln Gln Gln  
 1 5 10 15

Glu Leu Leu Leu Gln Val Ile Pro Gln Asp Tyr Phe Asn Asn Asp Leu  
 20 25 30

Thr Gln Ala Cys Tyr Ala Pro Gln Ala Gly Thr Leu Gln Val Val Glu  
 35 40 45

Ile Ser Lys Ile Cys Thr Ala Lys Lys Asp Gly Val Thr Thr Ala Tyr  
 50 55 60

Ala Phe Glu Ser Thr Ala His Asp Gly Tyr Ser Gly Asp Ile His Ile  
 65 70 75 80

Leu Val Gly Met Lys Pro Asp Gly Glu Val Leu Gly Val Arg Ile Thr  
 85 90 95

Glu His His Glu Thr Pro Gly Leu Gly Asp Lys Ile Glu Thr Arg Ile  
 100 105 110

Ser Asn Trp Val Leu Ser Phe Asp His Gln Val Ile Ser Asn Glu Asn  
 115 120 125

Ala Ala Glu Trp Ala Val Lys Lys Asp Gly Gly Lys Phe Asp Gln Phe  
 130 135 140

Ala Gly Ala Thr Ile Thr Pro Arg Ala Val Val Asn Gln Val Lys Arg  
 145 150 155 160

Ala Ala Leu Ala Met Leu Asp Asn Leu Pro Lys Glu Arg Glu Ser Asp  
 165 170 175

Gly

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 Met Asp Lys Leu Asp Glu Thr Gln Glu Leu Gln Gln Thr Glu Ala Lys  
 1 5 10 15

agt gcg gtt gac aaa aaa caa cat ttt ttg aac gtt ggt tct gcc aac 96  
 Ser Ala Val Asp Lys Lys Gln His Phe Leu Asn Val Gly Ser Ala Asn  
 20 25 30

ggc ccc gaa ggg gtg aat aag cga aca agt gag ctt atg aat aat att 144  
 Gly Pro Glu Gly Val Asn Lys Arg Thr Ser Glu Leu Met Asn Asn Ile  
 35 40 45

tca aat gaa aaa agc att tgg aaa acg att ttc att cag ggc atc tgg 192  
 Ser Asn Glu Lys Ser Ile Trp Lys Thr Ile Phe Ile Gln Gly Ile Trp  
 50 55 60

acc aac aat tcc acc gtg gtg caa ctg ctt ggg ttg tgt ccg ctg ctg 240  
 Thr Asn Asn Ser Thr Val Val Gln Leu Leu Gly Leu Cys Pro Leu Leu  
 65 70 75 80

gcg gtg tcc aac tcc gtg acc aac gcc ctc ggg ctg ggt tta gcc acc 288  
 Ala Val Ser Asn Ser Val Thr Asn Ala Leu Gly Leu Gly Leu Ala Thr  
 85 90 95

atg ctt gtg ctg acg tgt acg aac acg gta gtt tct ctt ttc cgt aag 336  
 Met Leu Val Leu Thr Cys Thr Asn Thr Val Val Ser Leu Phe Arg Lys  
 100 105 110

cac atc ccc aat gaa atc cgc att ccg att tat gtg atg atc atc gca 384  
 His Ile Pro Asn Glu Ile Arg Ile Pro Ile Tyr Val Met Ile Ile Ala  
 115 120 125

acc acg gta acc gct gtg caa tta ttg atg aat gcc tat acc tac gcg 432  
 Thr Thr Val Thr Ala Val Gln Leu Leu Met Asn Ala Tyr Thr Tyr Ala  
 130 135 140

ctt tat caa tct ctc ggg att ttt att ccg ctc atc gtc acc aac tgt 480  
 Leu Tyr Gln Ser Leu Gly Ile Phe Ile Pro Leu Ile Val Thr Asn Cys  
 145 150 155 160

att gtg atc ggt cgc gcc gaa gcc ttt gct tcc aag aac agc att tcc 528  
 Ile Val Ile Gly Arg Ala Glu Ala Phe Ala Ser Lys Asn Ser Ile Ser  
 165 170 175

cat tcc gcc ttt gac ggt ttt tcc atg gga tta ggg atg tta ttc agt 576  
 His Ser Ala Phe Asp Gly Phe Ser Met Gly Leu Gly Met Leu Phe Ser

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180	185	190	
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Leu Val Ala Leu Gly Gly Ile Arg Glu Ile Ile Gly Asn Gly Thr Leu			
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Phe Asp Gly Ile Glu Asn Leu Leu Gly Asp Trp Ala Lys Phe Met Arg			
210	215	220	
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Ile Glu Phe Phe His Asn Asp Ser Asn Leu Leu Leu Ala Ile Leu Pro			
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ccc ggc gca ttt att ggt tta gct ttg ttg tta gcc tta aaa aat gta			768
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Ser Ala Val Asp Lys Lys Gln His Phe Leu Asn Val Gly Ser Ala Asn			
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Gly Pro Glu Gly Val Asn Lys Arg Thr Ser Glu Leu Met Asn Asn Ile			
35	40	45	
Ser Asn Glu Lys Ser Ile Trp Lys Thr Ile Phe Ile Gln Gly Ile Trp			
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Thr Asn Asn Ser Thr Val Val Gln Leu Leu Gly Leu Cys Pro Leu Leu			
65	70	75	80
Ala Val Ser Asn Ser Val Thr Asn Ala Leu Gly Leu Gly Leu Ala Thr			
85	90	95	
Met Leu Val Leu Thr Cys Thr Asn Thr Val Val Ser Leu Phe Arg Lys			
100	105	110	

His Ile Pro Asn Glu Ile Arg Ile Pro Ile Tyr Val Met Ile Ile Ala  
 115 120 125

Thr Thr Val Thr Ala Val Gln Leu Leu Met Asn Ala Tyr Thr Tyr Ala  
 130 135 140

Leu Tyr Gln Ser Leu Gly Ile Phe Ile Pro Leu Ile Val Thr Asn Cys  
 145 150 155 160

Ile Val Ile Gly Arg Ala Glu Ala Phe Ala Ser Lys Asn Ser Ile Ser  
 165 170 175

His Ser Ala Phe Asp Gly Phe Ser Met Gly Leu Gly Met Leu Phe Ser  
 180 185 190

Leu Val Ala Leu Gly Gly Ile Arg Glu Ile Ile Gly Asn Gly Thr Leu  
 195 200 205

Phe Asp Gly Ile Glu Asn Leu Leu Gly Asp Trp Ala Lys Phe Met Arg  
 210 215 220

Ile Glu Phe Phe His Asn Asp Ser Asn Leu Leu Leu Ala Ile Leu Pro  
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 1 5 10 15

ttc gcg att ttt att tat aat gaa gac gct atg ttt tta aat ata cat 96  
 Phe Ala Ile Phe Ile Tyr Asn Glu Asp Ala Met Phe Leu Asn Ile His

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Val Ile Tyr Lys Phe Leu Leu Leu Cys Val Leu Ile Ile Ser Leu Leu			
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Cys Val Val Ile Ser Gly Ala Gly Leu Phe Tyr Gly Trp Gln Leu Ser			
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Met Leu Phe Asn Ile His Val Ser Phe Ala Val Leu Leu Val Ala Ala			
85	90	95	
ttg tta ctg cat att ctg aac cgc aaa aat aaa ttg gcg aaa atc aat			336
Leu Leu Leu His Ile Leu Asn Arg Lys Asn Lys Leu Ala Lys Ile Asn			
100	105	110	
acc caa ttt gcc gat ttg gtc tta cac aat aaa tac ccg agt tat tgc			384
Thr Gln Phe Ala Asp Leu Val Leu His Asn Lys Tyr Pro Ser Tyr Cys			
115	120	125	
aat tta gac cgc ttg atc atg acg ttc gag cat ttt tcc gtt gtg caa			432
Asn Leu Asp Arg Leu Ile Met Thr Phe Glu His Phe Ser Val Val Gln			
130	135	140	
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Ile Ala Glu Gln Leu Asn Leu Asp Leu Asp Ala Leu Leu Lys Glu Leu			
145	150	155	160
gcc gaa gga aaa ata aac gtc aaa aat tcc cac agc act tta cgg gag			528
Ala Glu Gly Lys Ile Asn Val Lys Asn Ser His Ser Thr Leu Arg Glu			
165	170	175	
aat ttt ccc cat aat gat gaa aag att ttt gct gcg atc acc atc gtg			576
Asn Phe Pro His Asn Asp Glu Lys Ile Phe Ala Ala Ile Thr Ile Val			
180	185	190	
ctg caa ctt cgt tta att aat cct atc cct gct ttt aac tta aaa gga			624
Leu Gln Leu Arg Leu Ile Asn Pro Ile Pro Ala Phe Asn Leu Lys Gly			
195	200	205	
cat			627
His			

<210> 128  
 <211> 209  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans  
 <400> 128

Met Asn Phe Thr Lys Thr Leu Tyr Ile Phe Lys Tyr Thr Gly Glu Leu  
 1 5 10 15

Phe Ala Ile Phe Ile Tyr Asn Glu Asp Ala Met Phe Leu Asn Ile His  
 20 25 30

Arg Tyr Ile Phe Leu Thr Phe Cys Trp Gly Asn Ile Met Lys Phe Glu  
 35 40 45

Val Ile Tyr Lys Phe Leu Leu Leu Cys Val Leu Ile Ile Ser Leu Leu  
 50 55 60

Cys Val Val Ile Ser Gly Ala Gly Leu Phe Tyr Gly Trp Gln Leu Ser  
 65 70 75 80

Met Leu Phe Asn Ile His Val Ser Phe Ala Val Leu Leu Val Ala Ala  
 85 90 95

Leu Leu Leu His Ile Leu Asn Arg Lys Asn Lys Leu Ala Lys Ile Asn  
 100 105 110

Thr Gln Phe Ala Asp Leu Val Leu His Asn Lys Tyr Pro Ser Tyr Cys  
 115 120 125

Asn Leu Asp Arg Leu Ile Met Thr Phe Glu His Phe Ser Val Val Gln  
 130 135 140

Ile Ala Glu Gln Leu Asn Leu Asp Leu Asp Ala Leu Leu Lys Glu Leu  
 145 150 155 160

Ala Glu Gly Lys Ile Asn Val Lys Asn Ser His Ser Thr Leu Arg Glu  
 165 170 175

Asn Phe Pro His Asn Asp Glu Lys Ile Phe Ala Ala Ile Thr Ile Val  
 180 185 190

Leu Gln Leu Arg Leu Ile Asn Pro Ile Pro Ala Phe Asn Leu Lys Gly  
 195 200 205

His

<210> 129  
 <211> 663  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1)..(663)

<400> 129  
 gtg caa tct tac gag cag caa agt aat aac ggc gtg ccg att caa ttc 48  
 Val Gln Ser Tyr Glu Gln Gln Ser Asn Asn Gly Val Pro Ile Gln Phe  
 1 5 10 15  
 cag cag tta gac caa tca caa acc gtt gaa ccg acc gtg ttg gat aat 96  
 Gln Gln Leu Asp Gln Ser Gln Thr Val Glu Pro Thr Val Leu Asp Asn  
 20 25 30  
 ctg acc ccg caa acc gat aac act gtc gcg caa caa cct gct gcg gaa 144  
 Leu Thr Pro Gln Thr Asp Asn Thr Val Ala Gln Gln Pro Ala Ala Glu  
 35 40 45  
 acc aat acg caa aat gtc aat gcc ggc gcc ata gaa ccg caa gcg gtg 192  
 Thr Asn Thr Gln Asn Val Asn Ala Gly Ala Ile Glu Pro Gln Ala Val  
 50 55 60  
 gaa caa ggg gca acc acc tcc gtt gct gag caa acg aca act gcg gcg 240  
 Glu Gln Gly Ala Thr Thr Ser Val Ala Glu Gln Thr Thr Thr Ala Ala  
 65 70 75 80  
 gta gaa aat aaa ccg gca gaa gtc aaa ccg gaa gag gtc gaa acc gtt 288  
 Val Glu Asn Lys Pro Ala Glu Val Lys Pro Glu Glu Val Glu Thr Val  
 85 90 95  
 aaa ccg agt gag cct gca aaa gcg caa gaa gcc gtc aaa ccg cgt caa 336  
 Lys Pro Ser Glu Pro Ala Lys Ala Gln Glu Ala Val Lys Pro Arg Gln  
 100 105 110  
 cat cag gaa agc gtg aaa aaa gag ccg gtg aaa acc gat aaa gtg aaa 384  
 His Gln Glu Ser Val Lys Lys Glu Pro Val Lys Thr Asp Lys Val Lys  
 115 120 125  
 cag gct gaa aaa gcg act gct aaa aat caa ccg act aaa tcg gca aaa 432  
 Gln Ala Glu Lys Ala Thr Ala Lys Asn Gln Pro Thr Lys Ser Ala Lys  
 130 135 140  
 acc gaa aaa gaa gta cgg gat att tta gaa ggc aaa aca acg act atc 480  
 Thr Glu Lys Glu Val Arg Asp Ile Leu Glu Gly Lys Thr Thr Thr Ile  
 145 150 155 160  
 acc aaa gca gca gcc ggt agc aaa acc tta acc att ccg caa ggc gtg 528  
 Thr Lys Ala Ala Ala Gly Ser Lys Thr Leu Thr Ile Pro Gln Gly Val  
 165 170 175  
 acc tta atg cag gtg ttc cgt gac aac cat cta cct gtc ggt gat gtg 576  
 Thr Leu Met Gln Val Phe Arg Asp Asn His Leu Pro Val Gly Asp Val  
 180 185 190

aat gcc atg acc aaa gcc aaa ggc gta ggc aag gtg tta agc agc ttc 624  
 Asn Ala Met Thr Lys Ala Lys Gly Val Gly Lys Val Leu Ser Ser Phe  
           195                          200                          205

aag ccg ggt gat aag gta cag gtt tcc ctg aat gca caa 663  
 Lys Pro Gly Asp Lys Val Gln Val Ser Leu Asn Ala Gln  
           210                          215                          220

<210> 130

<211> 221

<212> PRT

<213> Actinobacillus actinomycetemcomitans

<400> 130

Val Gln Ser Tyr Glu Gln Gln Ser Asn Asn Gly Val Pro Ile Gln Phe  
 1                          5                          10                          15

Gln Gln Leu Asp Gln Ser Gln Thr Val Glu Pro Thr Val Leu Asp Asn  
           20                          25                          30

Leu Thr Pro Gln Thr Asp Asn Thr Val Ala Gln Gln Pro Ala Ala Glu  
           35                          40                          45

Thr Asn Thr Gln Asn Val Asn Ala Gly Ala Ile Glu Pro Gln Ala Val  
           50                          55                          60

Glu Gln Gly Ala Thr Thr Ser Val Ala Glu Gln Thr Thr Thr Ala Ala  
 65                          70                          75                          80

Val Glu Asn Lys Pro Ala Glu Val Lys Pro Glu Glu Val Glu Thr Val  
           85                          90                          95

Lys Pro Ser Glu Pro Ala Lys Ala Gln Glu Ala Val Lys Pro Arg Gln  
           100                          105                          110

His Gln Glu Ser Val Lys Lys Glu Pro Val Lys Thr Asp Lys Val Lys  
           115                          120                          125

Gln Ala Glu Lys Ala Thr Ala Lys Asn Gln Pro Thr Lys Ser Ala Lys  
           130                          135                          140

Thr Glu Lys Glu Val Arg Asp Ile Leu Glu Gly Lys Thr Thr Thr Ile  
 145                          150                          155                          160



Thr Lys Ala Ala Ala Gly Ser Lys Thr Leu Thr Ile Pro Gln Gly Val  
165 170 175

Thr Leu Met Gln Val Phe Arg Asp Asn His Leu Pro Val Gly Asp Val  
180 185 190

Asn Ala Met Thr Lys Ala Lys Gly Val Gly Lys Val Leu Ser Ser Phe  
195 200 205

Lys Pro Gly Asp Lys Val Gln Val Ser Leu Asn Ala Gln  
210 215 220

<210> 131

<211> 478

<212> DNA

<213> Actinobacillus actinomycetemcomitans

<220>

<221> CDS

<222> (1)..(477)

<400> 131

atg tta aaa aaa atc tta cat tcc gca ctc atc ggt ttg gtt acg gca 48  
Met Leu Lys Lys Ile Leu His Ser Ala Leu Ile Gly Leu Val Thr Ala  
1 5 10 15

ggt gtg att ttg ttt gtg cta ccg aaa atc acc ggg aaa tcc gtg tta 96  
Gly Val Ile Leu Phe Val Leu Pro Lys Ile Thr Gly Lys Ser Val Leu  
20 25 30

ccg gag caa gaa atc gcc tct tat aaa gat gca gtg cgt att gct tcg 144  
Pro Glu Gln Glu Ile Ala Ser Tyr Lys Asp Ala Val Arg Ile Ala Ser  
35 40 45

ccg gcg gtt gtg aac gtt tat aat cag gcg ttt act tct tcg tcc gcg 192  
Pro Ala Val Val Asn Val Tyr Asn Gln Ala Phe Thr Ser Ser Ser Ala  
50 55 60

caa ttg cag gtg aat aac ctc ggt tcg ggc gtg atc atg tca aaa gac 240  
Gln Leu Gln Val Asn Asn Leu Gly Ser Gly Val Ile Met Ser Lys Asp  
65 70 75 80

ggt tat att ctg acg aac aaa cac gtt att caa aat gcc gat caa att 288  
Gly Tyr Ile Leu Thr Asn Lys His Val Ile Gln Asn Ala Asp Gln Ile  
85 90 95

gta gta gcg ttg caa aac ggg cat att ttt gat gcg gcg ctc att ggt 336  
Val Val Ala Leu Gln Asn Gly His Ile Phe Asp Ala Ala Leu Ile Gly  
100 105 110

tcc gat tct tta acg gat ttg gca gta tta aaa att aaa gcg gat aat 384  
Ser Asp Ser Leu Thr Asp Leu Ala Val Leu Lys Ile Lys Ala Asp Asn  
115 120 125

tta tcc acg att ccg caa aat ctc agc cgt ccg gtg cat gtg gga gat 432  
 Leu Ser Thr Ile Pro Gln Asn Leu Ser Arg Pro Val His Val Gly Asp  
 130 135 140

gtg gcg ctg gca atc ggc aat ccg tat aac ctg ggg caa agc gtg t 478  
 Val Ala Leu Ala Ile Gly Asn Pro Tyr Asn Leu Gly Gln Ser Val  
 145 150 155

<210> 132  
 <211> 159  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 132

Met Leu Lys Lys Ile Leu His Ser Ala Leu Ile Gly Leu Val Thr Ala  
 1 5 10 15

Gly Val Ile Leu Phe Val Leu Pro Lys Ile Thr Gly Lys Ser Val Leu  
 20 25 30

Pro Glu Gln Glu Ile Ala Ser Tyr Lys Asp Ala Val Arg Ile Ala Ser  
 35 40 45

Pro Ala Val Val Asn Val Tyr Asn Gln Ala Phe Thr Ser Ser Ser Ala  
 50 55 60

Gln Leu Gln Val Asn Asn Leu Gly Ser Gly Val Ile Met Ser Lys Asp  
 65 70 75 80

Gly Tyr Ile Leu Thr Asn Lys His Val Ile Gln Asn Ala Asp Gln Ile  
 85 90 95

Val Val Ala Leu Gln Asn Gly His Ile Phe Asp Ala Ala Leu Ile Gly  
 100 105 110

Ser Asp Ser Leu Thr Asp Leu Ala Val Leu Lys Ile Lys Ala Asp Asn  
 115 120 125

Leu Ser Thr Ile Pro Gln Asn Leu Ser Arg Pro Val His Val Gly Asp  
 130 135 140

Val Ala Leu Ala Ile Gly Asn Pro Tyr Asn Leu Gly Gln Ser Val  
 145 150 155

<210> 133  
 <211> 537  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1)..(537)

<400> 133  
 gcc ggc tgg cag ata aaa aat aac aaa cct ttt gac ggt aaa gac tgg 48  
 Ala Gly Trp Gln Ile Lys Asn Asn Lys Pro Phe Asp Gly Lys Asp Trp  
 1 5 10 15  
 acc cgt tgg gtc gat gcg aga gaa tcc gga gcc att gcc ggt gca gta 96  
 Thr Arg Trp Val Asp Ala Arg Glu Ser Gly Ala Ile Ala Gly Ala Val  
 20 25 30  
 gaa ttt aac aat tat gtc aat tct cat aaa ggc aaa atg ttc tat gtg 144  
 Glu Phe Asn Asn Tyr Val Asn Ser His Lys Gly Lys Met Phe Tyr Val  
 35 40 45  
 tca aat cgc aaa gac agt aat gaa aaa gca ggt acc att gat gac atg 192  
 Ser Asn Arg Lys Asp Ser Asn Glu Lys Ala Gly Thr Ile Asp Asp Met  
 50 55 60  
 aaa cgt tta ggc ttt acc ggt gtt gat gaa tca tcc ctt tat ctg aaa 240  
 Lys Arg Leu Gly Phe Thr Gly Val Asp Glu Ser Ser Leu Tyr Leu Lys  
 65 70 75 80  
 aaa gat aaa tcc gcc aaa tct gcc cgt ttt gca gaa att gaa agt caa 288  
 Lys Asp Lys Ser Ala Lys Ser Ala Arg Phe Ala Glu Ile Glu Ser Gln  
 85 90 95  
 ggc tat gac atc gtg ctt tat gta ggc gac aac ctg gat gat ttc ggt 336  
 Gly Tyr Asp Ile Val Leu Tyr Val Gly Asp Asn Leu Asp Asp Phe Gly  
 100 105 110  
 gat gca aca cac ggt aaa tta aat gcg gat cgt cga gac ttt gtt gct 384  
 Asp Ala Thr His Gly Lys Leu Asn Ala Asp Arg Arg Asp Phe Val Ala  
 115 120 125  
 aaa aac cag gcg aaa ttc ggt aaa act tat atc gtt tta cct aat ccg 432  
 Lys Asn Gln Ala Lys Phe Gly Lys Thr Tyr Ile Val Leu Pro Asn Pro  
 130 135 140  
 aat tac ggt ggt tgg gaa ggc ggt tta gcc aaa gac tac ttt aaa ggt 480  
 Asn Tyr Gly Gly Trp Glu Gly Gly Leu Ala Lys Asp Tyr Phe Lys Gly  
 145 150 155 160  
 gat tcc caa agc aaa gtt gat gcc cgc tta aat gta att aag gca tgg 528  
 Asp Ser Gln Ser Lys Val Asp Ala Arg Leu Asn Val Ile Lys Ala Trp  
 165 170 175  
 agt gga aaa 537  
 Ser Gly Lys

<210> 134  
 <211> 179  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 134

Ala Gly Trp Gln Ile Lys Asn Asn Lys Pro Phe Asp Gly Lys Asp Trp  
 1 5 10 15

Thr Arg Trp Val Asp Ala Arg Glu Ser Gly Ala Ile Ala Gly Ala Val  
 20 25 30

Glu Phe Asn Asn Tyr Val Asn Ser His Lys Gly Lys Met Phe Tyr Val  
 35 40 45

Ser Asn Arg Lys Asp Ser Asn Glu Lys Ala Gly Thr Ile Asp Asp Met  
 50 55 60

Lys Arg Leu Gly Phe Thr Gly Val Asp Glu Ser Ser Leu Tyr Leu Lys  
 65 70 75 80

Lys Asp Lys Ser Ala Lys Ser Ala Arg Phe Ala Glu Ile Glu Ser Gln  
 85 90 95

Gly Tyr Asp Ile Val Leu Tyr Val Gly Asp Asn Leu Asp Asp Phe Gly  
 100 105 110

Asp Ala Thr His Gly Lys Leu Asn Ala Asp Arg Arg Asp Phe Val Ala  
 115 120 125

Lys Asn Gln Ala Lys Phe Gly Lys Thr Tyr Ile Val Leu Pro Asn Pro  
 130 135 140

Asn Tyr Gly Gly Trp Glu Gly Gly Leu Ala Lys Asp Tyr Phe Lys Gly  
 145 150 155 160

Asp Ser Gln Ser Lys Val Asp Ala Arg Leu Asn Val Ile Lys Ala Trp  
 165 170 175

Ser Gly Lys

<210> 135  
 <211> 765  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1)..(765)

<400> 135  
 atg tgg ata ttt tac aac acc cgg aca ttc gtg ccg aat tac cgg ctt 48  
 Met Trp Ile Phe Tyr Asn Thr Arg Thr Phe Val Pro Asn Tyr Arg Leu  
 1 5 10 15

atg cca act ggc cga cat tcc cgc aat tat ggg tgg aag gcg agc tca 96  
 Met Pro Thr Gly Arg His Ser Arg Asn Tyr Gly Trp Lys Ala Ser Ser  
 20 25 30

tgc gtg gtt gcg aca tcg tgt tgg aaa tgt acc aac aag gtg agc tta 144  
 Ser Val Val Ala Thr Ser Cys Trp Lys Cys Thr Asn Lys Val Ser Leu  
 35 40 45

aaa cct tgt tac aag agg ttg ccg caa gac atc cgc aag cgt aaa aac 192  
 Lys Pro Cys Tyr Lys Arg Leu Pro Gln Asp Ile Arg Lys Arg Lys Asn  
 50 55 60

gcg ttt caa aat gac cgt act ttg gtt tcc gga gtg cgg ttt ttt gct 240  
 Ala Phe Gln Asn Asp Arg Thr Leu Val Ser Gly Val Arg Phe Phe Ala  
 65 70 75 80

gct tgg cgc agg gaa aaa cag gcg gtt tgt gct ata att ctc cgc aaa 288  
 Ala Trp Arg Arg Glu Lys Gln Ala Val Cys Ala Ile Ile Leu Arg Lys  
 85 90 95

ttt tta ccg cac ttt agg atc aat atg tcg ttt caa ttc aac gcg atc 336  
 Phe Leu Pro His Phe Arg Ile Asn Met Ser Phe Gln Phe Asn Ala Ile  
 100 105 110

gcc tta ctt ttg gtg att tta att tta tta ggt gta ctc agc cac aac 384  
 Ala Leu Leu Leu Val Ile Leu Ile Leu Leu Gly Val Leu Ser His Asn  
 115 120 125

agt tcc atc acc att tcc gct gcc gta ttg ctc atc atg caa caa acc 432  
 Ser Ser Ile Thr Ile Ser Ala Ala Val Leu Leu Ile Met Gln Gln Thr  
 130 135 140

ttg ctc gca aaa tat att cct tac ttg gaa aaa tac ggc ttg agc atc 480  
 Leu Leu Ala Lys Tyr Ile Pro Tyr Leu Glu Lys Tyr Gly Leu Ser Ile  
 145 150 155 160

ggt atc gta att tta acc atc ggc gta cta agc ccg ttg gtt tcc ggc 528  
 Gly Ile Val Ile Leu Thr Ile Gly Val Leu Ser Pro Leu Val Ser Gly  
 165 170 175

aga att caa ctg cct ggc ttg tcg gca ttt ttt agc tgg cga atg ttt 576  
 Arg Ile Gln Leu Pro Gly Leu Ser Ala Phe Phe Ser Trp Arg Met Phe  
 180 185 190

gtt gcc att ggc gtc ggc gta tta gtg gcg tgg ctt gcc ggc aaa ggc 624  
Val Ala Ile Gly Val Gly Val Leu Val Ala Trp Leu Ala Gly Lys Gly  
195 200 205

gtt ccg ctc atg ggg gaa gag cct gtt ctg gta acc ggc ttg gtt atc 672  
Val Pro Leu Met Gly Glu Glu Pro Val Leu Val Thr Gly Leu Val Ile  
210 215 220

ggc acc att atc ggc gtt tct ttt ctc ggt ggt att ccc gtt ggt ccc 720  
Gly Thr Ile Ile Gly Val Ser Phe Leu Gly Gly Ile Pro Val Gly Pro  
225 230 235 240

ctt att gcg gca ggg att ttg gca tta tta ata gga aaa ttt taa 765  
Leu Ile Ala Ala Gly Ile Leu Ala Leu Leu Ile Gly Lys Phe  
245 250

<210> 136  
<211> 254  
<212> PRT  
<213> Actinobacillus actinomycetemcomitans

<400> 136

Met Trp Ile Phe Tyr Asn Thr Arg Thr Phe Val Pro Asn Tyr Arg Leu  
1 5 10 15

Met Pro Thr Gly Arg His Ser Arg Asn Tyr Gly Trp Lys Ala Ser Ser  
20 25 30

Ser Val Val Ala Thr Ser Cys Trp Lys Cys Thr Asn Lys Val Ser Leu  
35 40 45

Lys Pro Cys Tyr Lys Arg Leu Pro Gln Asp Ile Arg Lys Arg Lys Asn  
50 55 60

Ala Phe Gln Asn Asp Arg Thr Leu Val Ser Gly Val Arg Phe Phe Ala  
65 70 75 80

Ala Trp Arg Arg Glu Lys Gln Ala Val Cys Ala Ile Ile Leu Arg Lys  
85 90 95

Phe Leu Pro His Phe Arg Ile Asn Met Ser Phe Gln Phe Asn Ala Ile  
100 105 110

Ala Leu Leu Leu Val Ile Leu Ile Leu Leu Gly Val Leu Ser His Asn  
115 120 125

Ser Ser Ile Thr Ile Ser Ala Ala Val Leu Leu Ile Met Gln Gln Thr  
130 135 140

Leu Leu Ala Lys Tyr Ile Pro Tyr Leu Glu Lys Tyr Gly Leu Ser Ile  
145 150 155 160

Gly Ile Val Ile Leu Thr Ile Gly Val Leu Ser Pro Leu Val Ser Gly  
165 170 175

Arg Ile Gln Leu Pro Gly Leu Ser Ala Phe Phe Ser Trp Arg Met Phe  
180 185 190

Val Ala Ile Gly Val Gly Val Leu Val Ala Trp Leu Ala Gly Lys Gly  
195 200 205

Val Pro Leu Met Gly Glu Glu Pro Val Leu Val Thr Gly Leu Val Ile  
210 215 220

Gly Thr Ile Ile Gly Val Ser Phe Leu Gly Gly Ile Pro Val Gly Pro  
225 230 235 240

Leu Ile Ala Ala Gly Ile Leu Ala Leu Leu Ile Gly Lys Phe  
245 250

<210> 137  
<211> 387  
<212> DNA  
<213> Actinobacillus actinomycetemcomitans

<220>  
<221> CDS  
<222> (1)..(387)

<400> 137  
atg aaa aac aaa tgg tta ttg att gcc gcc gtg agc ggt ttt tta tgt 48  
Met Lys Asn Lys Trp Leu Leu Ile Ala Ala Val Ser Gly Phe Leu Cys  
1 5 10 15

gtg act atc ggt gcg ttt gcg gcg cac ggt tta agc caa gtg ttg gac 96  
Val Thr Ile Gly Ala Phe Ala Ala His Gly Leu Ser Gln Val Leu Asp  
20 25 30

gcg aaa gcc tta gcg tgg att gac acc ggc gtg aaa tat caa atg ttc 144  
Ala Lys Ala Leu Ala Trp Ile Asp Thr Gly Val Lys Tyr Gln Met Phe  
35 40 45

cac acc ctc gcc atc atg gga atc ggc atc gca caa tta tgt cgc gaa 192  
His Thr Leu Ala Ile Met Gly Ile Gly Ile Ala Gln Leu Cys Arg Glu  
50 55 60





Leu Ile Gly Trp Leu Gly Leu Ala Tyr Gly Ala Phe Lys Ser Lys Ser  
 115 120 125

Glu

<210> 139  
 <211> 684  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1)..(684)

<400> 139  
 atc aat ttg gca cat aat tat cag caa aaa tgg cag gcg gac atc ggt 48  
 Ile Asn Leu Ala His Asn Tyr Gln Gln Lys Trp Gln Ala Asp Ile Gly  
 1 5 10 15  
 cgg cac gcc gtg cag tat ttt gct tac gat aac ccg cgg gcg gat ttt 96  
 Arg His Ala Val Gln Tyr Phe Ala Tyr Asp Asn Pro Arg Ala Asp Phe  
 20 25 30  
 tac gcc gaa caa att cat ttc tcc gaa caa ggc gcc tat ttc tta ctc 144  
 Tyr Ala Glu Gln Ile His Phe Ser Glu Gln Gly Ala Tyr Phe Leu Leu  
 35 40 45  
 cac acg ccg caa ggc cgc gtg caa atc aat tca ccg tat ttg ggt gag 192  
 His Thr Pro Gln Gly Arg Val Gln Ile Asn Ser Pro Tyr Leu Gly Glu  
 50 55 60  
 cat aat atc tct aat gcg ttg gcg gca act gcc ttg gcg atg aac gtg 240  
 His Asn Ile Ser Asn Ala Leu Ala Ala Thr Ala Leu Ala Met Asn Val  
 65 70 75 80  
 ggt gcc acc acg gcg cag gtg aaa aaa ggg ttg gaa acg ccc tct ttg 288  
 Gly Ala Thr Thr Ala Gln Val Lys Lys Gly Leu Glu Thr Pro Ser Leu  
 85 90 95  
 gtg aaa ggg cgt ttg ttc ccg att cag cct tgt gaa aat ctg tta ttg 336  
 Val Lys Gly Arg Leu Phe Pro Ile Gln Pro Cys Glu Asn Leu Leu Leu  
 100 105 110  
 ctg gac gat act tac aac gcc aat gtg gga tct atg aaa tcg gcg att 384  
 Leu Asp Asp Thr Tyr Asn Ala Asn Val Gly Ser Met Lys Ser Ala Ile  
 115 120 125  
 tcc gtg tta caa aaa tat cct gct ttt cgc gtc ttt gtt gtt ggt gat 432  
 Ser Val Leu Gln Lys Tyr Pro Ala Phe Arg Val Phe Val Val Gly Asp  
 130 135 140  
 atg ggc gaa tta ggc gat aat gcg caa ctt tgc cat caa gag gtg ggg 480  
 Met Gly Glu Leu Gly Asp Asn Ala Gln Leu Cys His Gln Glu Val Gly  
 145 150 155 160

gag ttc gct cat gcc gcc aag tta gac tta gtg ctt tct ttc ggg tgt 528  
 Glu Phe Ala His Ala Ala Lys Leu Asp Leu Val Leu Ser Phe Gly Cys  
                   165                  170                  175

tcc agt ggc gtt ata agt gcg gtt aat tcg gga cgc cat ttt acc gat 576  
 Ser Ser Gly Val Ile Ser Ala Val Asn Ser Gly Arg His Phe Thr Asp  
                   180                  185                  190

aaa acg gaa ctt gta act tat tta aca ccg att att caa caa caa tta 624  
 Lys Thr Glu Leu Val Thr Tyr Leu Thr Pro Ile Ile Gln Gln Gln Leu  
                   195                  200                  205

gca caa caa aaa gtc gtt gtt ttg gtg aaa gga tca cgc agc atg aaa 672  
 Ala Gln Gln Lys Val Val Val Leu Val Lys Gly Ser Arg Ser Met Lys  
                   210                  215                  220

atg gaa gaa gtg 684  
 Met Glu Glu Val  
 225

<210> 140  
 <211> 228  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 140

Ile Asn Leu Ala His Asn Tyr Gln Gln Lys Trp Gln Ala Asp Ile Gly  
 1                  5                  10                  15

Arg His Ala Val Gln Tyr Phe Ala Tyr Asp Asn Pro Arg Ala Asp Phe  
                   20                  25                  30

Tyr Ala Glu Gln Ile His Phe Ser Glu Gln Gly Ala Tyr Phe Leu Leu  
                   35                  40                  45

His Thr Pro Gln Gly Arg Val Gln Ile Asn Ser Pro Tyr Leu Gly Glu  
                   50                  55                  60

His Asn Ile Ser Asn Ala Leu Ala Ala Thr Ala Leu Ala Met Asn Val  
 65                  70                  75                  80

Gly Ala Thr Thr Ala Gln Val Lys Lys Gly Leu Glu Thr Pro Ser Leu  
                   85                  90                  95

Val Lys Gly Arg Leu Phe Pro Ile Gln Pro Cys Glu Asn Leu Leu Leu  
                   100                  105                  110



ggt caa acc aga aaa atg aac gaa ccg cct acg ccg gaa gaa tat gaa 240  
 Gly Gln Thr Arg Lys Met Asn Glu Pro Pro Thr Pro Glu Glu Tyr Glu  
 65 70 75 80

ata ttt aaa agg tcc att gta acc ttt 267  
 Ile Phe Lys Arg Ser Ile Val Thr Phe  
 85

<210> 142  
 <211> 89  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 142

Asp Gly Gly Lys Ala Gly Ser Arg Tyr Ala Gly Ile Ile Tyr Lys Ser  
 1 5 10 15

Val Lys Pro Tyr Phe Arg Gly Asp Ser Arg Phe Phe Gly Lys Val Cys  
 20 25 30

Asp Ile Arg Ile Glu Leu Ser Ser Asp Gly Thr Ile Leu Ser Tyr Gln  
 35 40 45

Lys Val Ser Gly Pro Asn Asp Leu Cys Gly Ala Ala Leu Asn Ala Ile  
 50 55 60

Gly Gln Thr Arg Lys Met Asn Glu Pro Pro Thr Pro Glu Glu Tyr Glu  
 65 70 75 80

Ile Phe Lys Arg Ser Ile Val Thr Phe  
 85

<210> 143  
 <211> 683  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1)..(681)

<400> 143

ggt gcc tta tat ttt gta ttc agt ctg atg ggc gtg ttc gcc agt ttg 48  
 Gly Ala Leu Tyr Phe Val Phe Ser Leu Met Gly Val Phe Ala Ser Leu  
 1 5 10 15

tta tcc acc gcg cgc ggc ggc tgg att ggt atc cct ttt gtt ctc ctg 96  
 Leu Ser Thr Ala Arg Gly Gly Trp Ile Gly Ile Pro Phe Val Leu Leu

20	25	30	
tta atc ctc ttt gct tat cgt cgt tat tta tcg aaa aaa ttc gtc gcc			144
Leu Ile Leu Phe Ala Tyr Arg Arg Tyr Leu Ser Lys Lys Phe Val Ala			
35	40	45	
ggc ttt ttt att gtg ctt gcc ctg att gta aca acc gtt gcg atg ttg			192
Gly Phe Phe Ile Val Leu Ala Leu Ile Val Thr Thr Val Ala Met Leu			
50	55	60	
cca aat acc aaa att aaa gaa cgc att gcc gcc gca gaa tac gac atc			240
Pro Asn Thr Lys Ile Lys Glu Arg Ile Ala Ala Ala Glu Tyr Asp Ile			
65	70	75	80
atc gcc tat ttt caa caa aat aac ggt tct acc tcc gtc ggc gcc cgt			288
Ile Ala Tyr Phe Gln Gln Asn Asn Gly Ser Thr Ser Val Gly Ala Arg			
85	90	95	
ttt gat atg tgg aaa agc gtg atg tta atg acg cag gaa aaa ccg att			336
Phe Asp Met Trp Lys Ser Val Met Leu Met Thr Gln Glu Lys Pro Ile			
100	105	110	
ttc ggt tgg ggc gta caa ggg gtc agc gaa aaa cgc aaa ctg caa tat			384
Phe Gly Trp Gly Val Gln Gly Val Ser Glu Lys Arg Lys Leu Gln Tyr			
115	120	125	
gag caa ggt ttg ata agc caa tat gcc gcc gcc ttt aac cac gcg cac			432
Glu Gln Gly Leu Ile Ser Gln Tyr Ala Ala Ala Phe Asn His Ala His			
130	135	140	
aac caa tat ttt gat gat tta tcc aaa cgc ggc gca tta ggt tta ctc			480
Asn Gln Tyr Phe Asp Asp Leu Ser Lys Arg Gly Ala Leu Gly Leu Leu			
145	150	155	160
gcc tta ctc ggc gta ttt tta gtg ccg ttg cgt ttc ttt ata cgg cat			528
Ala Leu Leu Gly Val Phe Leu Val Pro Leu Arg Phe Phe Ile Arg His			
165	170	175	
ctc aaa agc gtc gat tta gaa ctg aaa ctc gtt tcg ttg tta ggt gcg			576
Leu Lys Ser Val Asp Leu Glu Leu Lys Leu Val Ser Leu Leu Gly Ala			
180	185	190	
ggt cat att gtc tcc gtg atg ttc tac tgt ttc agc caa ggc ttt ttc			624
Val His Ile Val Ser Val Met Phe Tyr Cys Phe Ser Gln Gly Phe Phe			
195	200	205	
agc cat aac tcg ggc aat att ttc tat ttt ttc ccg gtg att gtg ttt			672
Ser His Asn Ser Gly Asn Ile Phe Tyr Phe Phe Pro Val Ile Val Phe			
210	215	220	
tac gcc ttg gt			683
Tyr Ala Leu			
225			

<210> 144

<211> 227

<212> PRT

<213> Actinobacillus actinomycetemcomitans

<400> 144

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Leu Ile Leu Phe Ala Tyr Arg Arg Tyr Leu Ser Lys Lys Phe Val Ala  
35 40 45

Gly Phe Phe Ile Val Leu Ala Leu Ile Val Thr Thr Val Ala Met Leu  
50 55 60

Pro Asn Thr Lys Ile Lys Glu Arg Ile Ala Ala Glu Tyr Asp Ile  
65 70 75 80

Ile Ala Tyr Phe Gln Gln Asn Asn Gly Ser Thr Ser Val Gly Ala Arg  
85 90 95

Phe Asp Met Trp Lys Ser Val Met Leu Met Thr Gln Glu Lys Pro Ile  
100 105 110

Phe Gly Trp Gly Val Gln Gly Val Ser Glu Lys Arg Lys Leu Gln Tyr  
115 120 125

Glu Gln Gly Leu Ile Ser Gln Tyr Ala Ala Ala Phe Asn His Ala His  
130 135 140

Asn Gln Tyr Phe Asp Asp Leu Ser Lys Arg Gly Ala Leu Gly Leu Leu  
145 150 155 160

Ala Leu Leu Gly Val Phe Leu Val Pro Leu Arg Phe Phe Ile Arg His  
165 170 175

Leu Lys Ser Val Asp Leu Glu Leu Lys Leu Val Ser Leu Leu Gly Ala  
180 185 190

Val His Ile Val Ser Val Met Phe Tyr Cys Phe Ser Gln Gly Phe Phe  
195 200 205

Ser His Asn Ser Gly Asn Ile Phe Tyr Phe Phe Pro Val Ile Val Phe  
 210 215 220

Tyr Ala Leu  
 225

<210> 145  
 <211> 408  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
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 <222> (1)..(408)

<400> 145  
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 Ala Asp Tyr Gly Ile Asp Tyr Gly Asn Asp Phe Val Gly Ile Ile Glu  
 1 5 10 15  
 gga aaa ttg aag tta aac aaa tca acg tta cat gat aat aac gcc tcc 96  
 Gly Lys Leu Lys Leu Asn Lys Ser Thr Leu His Asp Asn Asn Ala Ser  
 20 25 30  
 ggc tac cgt ggc aaa ctg aac gaa aag gca cgt ttg ggc gta agt tac 144  
 Gly Tyr Arg Gly Lys Leu Asn Glu Lys Ala Arg Leu Gly Val Ser Tyr  
 35 40 45  
 tta caa ggc tat cgc gta aca cca agc att ctt cct tat gcc aaa gtt 192  
 Leu Gln Gly Tyr Arg Val Thr Pro Ser Ile Leu Pro Tyr Ala Lys Val  
 50 55 60  
 ggg gtg caa act gct aaa ttt gaa agt gag gtt cgt aca cgc aac tac 240  
 Gly Val Gln Thr Ala Lys Phe Glu Ser Glu Val Arg Thr Arg Asn Tyr  
 65 70 75 80  
 tca gct acg cat agt gat acc aaa aac ggt ata ggt ttt ggt gcg ggt 288  
 Ser Ala Thr His Ser Asp Thr Lys Asn Gly Ile Gly Phe Gly Ala Gly  
 85 90 95  
 gtt aag gtc aat ctg gta ccg gac ttt gag cta agc ttg gaa tat tta 336  
 Val Lys Val Asn Leu Val Pro Asp Phe Glu Leu Ser Leu Glu Tyr Leu  
 100 105 110  
 agg act cat aac aaa ttt gat ggt caa aag tta aga ggt aat gta tat 384  
 Arg Thr His Asn Lys Phe Asp Gly Gln Lys Leu Arg Gly Asn Val Tyr  
 115 120 125  
 agc acc aac gct aca tat cgt ttc 408  
 Ser Thr Asn Ala Thr Tyr Arg Phe  
 130 135

<210> 146  
 <211> 136

<212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 146

Ala Asp Tyr Gly Ile Asp Tyr Gly Asn Asp Phe Val Gly Ile Ile Glu  
 1 5 10 15

Gly Lys Leu Lys Leu Asn Lys Ser Thr Leu His Asp Asn Asn Ala Ser  
 20 25 30

Gly Tyr Arg Gly Lys Leu Asn Glu Lys Ala Arg Leu Gly Val Ser Tyr  
 35 40 45

Leu Gln Gly Tyr Arg Val Thr Pro Ser Ile Leu Pro Tyr Ala Lys Val  
 50 55 60

Gly Val Gln Thr Ala Lys Phe Glu Ser Glu Val Arg Thr Arg Asn Tyr  
 65 70 75 80

Ser Ala Thr His Ser Asp Thr Lys Asn Gly Ile Gly Phe Gly Ala Gly  
 85 90 95

Val Lys Val Asn Leu Val Pro Asp Phe Glu Leu Ser Leu Glu Tyr Leu  
 100 105 110

Arg Thr His Asn Lys Phe Asp Gly Gln Lys Leu Arg Gly Asn Val Tyr  
 115 120 125

Ser Thr Asn Ala Thr Tyr Arg Phe  
 130 135

<210> 147  
 <211> 426  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1)..(426)

<400> 147

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 1 5 10 15

ctc aca aac gct gaa acc ttg tct gat ggt tta cca cca cag gca gct 96  
 Leu Thr Asn Ala Glu Thr Leu Ser Asp Gly Leu Pro Pro Gln Ala Ala



20										25										30										
ggt gat tat gtg ttc ttg gac ccg cat caa aac aat acg gat ata caa																									144					
Gly Asp Tyr Val Phe Leu Asp Pro His Gln Asn Asn Thr Asp Ile Gln																														
	35							40							45															
ttt cgt tta aaa ctt aaa ggc aaa caa tgg ctg gca gac ggt tcc caa																									192					
Phe Arg Leu Lys Leu Lys Gly Lys Gln Trp Leu Ala Asp Gly Ser Gln																														
	50						55						60																	
aat gcc ggc aaa agc tgg tcg cct gtg tgc gaa gtc agt ggc gaa tgc																									240					
Asn Ala Gly Lys Ser Trp Ser Pro Val Cys Glu Val Ser Gly Glu Cys																														
	65					70						75																		
aaa ctg gag aca tcc tcc aaa gcg gaa atc gaa cgc ttc ttt gag caa																									288					
Lys Leu Glu Thr Ser Ser Lys Ala Glu Ile Glu Arg Phe Phe Glu Gln																														
				85						90																				
tat ccg caa gta cta aac cga aca gat gtc agc tgc att cac aat atg																									336					
Tyr Pro Gln Val Leu Asn Arg Thr Asp Val Ser Cys Ile His Asn Met																														
				100						105																				
gcg ttc gct ttc tgc ggg tta act tta gat aaa aaa acc gat tat gtg																									384					
Ala Phe Ala Phe Cys Gly Leu Thr Leu Asp Lys Lys Thr Asp Tyr Val																														
				115						120																				
atg gtc gca tta gtg acc aat ccg cca caa gtc aca tcg tat																									426					
Met Val Ala Leu Val Thr Asn Pro Pro Gln Val Thr Ser Tyr																														
	130						135																							
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<213>	Actinobacillus actinomycetemcomitans																													
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Leu Thr Asn Ala Glu Thr Leu Ser Asp Gly Leu Pro Pro Gln Ala Ala																														
				20						25												30								
Gly Asp Tyr Val Phe Leu Asp Pro His Gln Asn Asn Thr Asp Ile Gln																														
				35						40												45								
Phe Arg Leu Lys Leu Lys Gly Lys Gln Trp Leu Ala Asp Gly Ser Gln																														
				50						55												60								
Asn Ala Gly Lys Ser Trp Ser Pro Val Cys Glu Val Ser Gly Glu Cys																														
	65						70															75			80					

Lys Leu Glu Thr Ser Ser Lys Ala Glu Ile Glu Arg Phe Phe Glu Gln  
85 90 95

Tyr Pro Gln Val Leu Asn Arg Thr Asp Val Ser Cys Ile His Asn Met  
100 105 110

Ala Phe Ala Phe Cys Gly Leu Thr Leu Asp Lys Lys Thr Asp Tyr Val  
115 120 125

Met Val Ala Leu Val Thr Asn Pro Pro Gln Val Thr Ser Tyr  
130 135 140

<210> 149  
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<212> DNA  
<213> Actinobacillus actinomycetemcomitans

<220>  
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<222> (1)..(678)

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Arg Arg Ile Ile Gly Thr Thr Thr Thr Gly Tyr Ser Leu Met Arg Ala  
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tta ttg cct ttt ctt cgt tta ttt aaa ttc gcc aaa ctg ccg tta att 96  
Leu Leu Pro Phe Leu Arg Leu Phe Lys Phe Ala Lys Leu Pro Leu Ile  
20 25 30

tta ggc ggc ttg ctg atg att tta ggg ctg gcg tcc agt atc ggg ttg 144  
Leu Gly Gly Leu Leu Met Ile Leu Gly Leu Ala Ser Ser Ile Gly Leu  
35 40 45

ctc acc ctt tcc ggc tgg ttt ctt gcc gcc acc gcc atc gcc ggt ttc 192  
Leu Thr Leu Ser Gly Trp Phe Leu Ala Ala Thr Ala Ile Ala Gly Phe  
50 55 60

ggc tcg cta ttt aac ttt ttc tac cca tcc gcc agc gta cgc ggt ttg 240  
Gly Ser Leu Phe Asn Phe Phe Tyr Pro Ser Ala Ser Val Arg Gly Leu  
65 70 75 80

gca atc ggg cgt acc gtg gcg cgc tac ctt gaa aaa gtg gtc acc cat 288  
Ala Ile Gly Arg Thr Val Ala Arg Tyr Leu Glu Lys Val Val Thr His  
85 90 95

gac gcc acc ttc cgc gta ttg gca aaa ctg cgt gtg cag gtg ttt gac 336  
Asp Ala Thr Phe Arg Val Leu Ala Lys Leu Arg Val Gln Val Phe Asp  
100 105 110

aaa atc att ccg tta agc cct gcg ctg ctc aac cgt tat cgt aac agc 384  
Lys Ile Ile Pro Leu Ser Pro Ala Leu Leu Asn Arg Tyr Arg Asn Ser

115	120	125	
gat tta tta aac cgc ttg gtt gcc gat gtg gac acc ctc gac agc cta			432
Asp Leu Leu Asn Arg Leu Val Ala Asp Val Asp Thr Leu Asp Ser Leu			
130	135	140	
tat ctt cgc ctc att gcg ccc ttt atc agc gcc ata gtg gtg att gcg			480
Tyr Leu Arg Leu Ile Ala Pro Phe Ile Ser Ala Ile Val Val Ile Ala			
145	150	155	160
ttc att acc ttt ggc ttg agt ttt att aat gcc ccg ctc gcg ctg ttt			528
Phe Ile Thr Phe Gly Leu Ser Phe Ile Asn Ala Pro Leu Ala Leu Phe			
165	170	175	
atc ggt ttc aca tta ctg gcg ctc ttg ctg gtt atc ccg acg att ttt			576
Ile Gly Phe Thr Leu Leu Ala Leu Leu Leu Val Ile Pro Thr Ile Phe			
180	185	190	
tac cat ttg ggt aac aaa ttc ggc gcc aaa ctt acc caa tcc cgc gcc			624
Tyr His Leu Gly Asn Lys Phe Gly Ala Lys Leu Thr Gln Ser Arg Ala			
195	200	205	
ctt tac cgc acg caa ttt atc gaa ttt att cag gcg caa gcg gaa tta			672
Leu Tyr Arg Thr Gln Phe Ile Glu Phe Ile Gln Ala Gln Ala Glu Leu			
210	215	220	
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Leu Leu			
225			
<210> 150			
<211> 226			
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Leu Leu Pro Phe Leu Arg Leu Phe Lys Phe Ala Lys Leu Pro Leu Ile			
20	25	30	
Leu Gly Gly Leu Leu Met Ile Leu Gly Leu Ala Ser Ser Ile Gly Leu			
35	40	45	
Leu Thr Leu Ser Gly Trp Phe Leu Ala Ala Thr Ala Ile Ala Gly Phe			
50	55	60	
Gly Ser Leu Phe Asn Phe Phe Tyr Pro Ser Ala Ser Val Arg Gly Leu			
65	70	75	80

Ala Ile Gly Arg Thr Val Ala Arg Tyr Leu Glu Lys Val Val Thr His  
85 90 95

Asp Ala Thr Phe Arg Val Leu Ala Lys Leu Arg Val Gln Val Phe Asp  
100 105 110

Lys Ile Ile Pro Leu Ser Pro Ala Leu Leu Asn Arg Tyr Arg Asn Ser  
115 120 125

Asp Leu Leu Asn Arg Leu Val Ala Asp Val Asp Thr Leu Asp Ser Leu  
130 135 140

Tyr Leu Arg Leu Ile Ala Pro Phe Ile Ser Ala Ile Val Val Ile Ala  
145 150 155 160

Phe Ile Thr Phe Gly Leu Ser Phe Ile Asn Ala Pro Leu Ala Leu Phe  
165 170 175

Ile Gly Phe Thr Leu Leu Ala Leu Leu Leu Val Ile Pro Thr Ile Phe  
180 185 190

Tyr His Leu Gly Asn Lys Phe Gly Ala Lys Leu Thr Gln Ser Arg Ala  
195 200 205

Leu Tyr Arg Thr Gln Phe Ile Glu Phe Ile Gln Ala Gln Ala Glu Leu  
210 215 220

Leu Leu  
225

<210> 151  
<211> 323  
<212> DNA  
<213> Actinobacillus actinomycetemcomitans

<220>  
<221> CDS  
<222> (1)..(321)

<400> 151  
cct tcc aaa ttg acg tta gct ctt gct att gca agt ggc tta agt gta 48  
Pro Ser Lys Leu Thr Leu Ala Leu Ala Ile Ala Ser Gly Leu Ser Val  
1 5 10 15

aca aat tta agc tat gcc act aac gat act att caa gcg ggc aac ggc 96  
Thr Asn Leu Ser Tyr Ala Thr Asn Asp Thr Ile Gln Ala Gly Asn Gly

20	25	30	
att gcc gtg gta caa acc caa tcg ggt gaa atc caa ggt tat att cat			144
Ile Ala Val Val Gln Thr Gln Ser Gly Glu Ile Gln Gly Tyr Ile His			
35	40	45	
aac gat att ttg acc tat aaa ggc att ccg tat gcc aca gca gaa cgt			192
Asn Asp Ile Leu Thr Tyr Lys Gly Ile Pro Tyr Ala Thr Ala Glu Arg			
50	55	60	
ttt atg cca cca aaa ccg gtg gag aat tgg caa ggg aca aaa atg gcg			240
Phe Met Pro Pro Lys Pro Val Glu Asn Trp Gln Gly Thr Lys Met Ala			
65	70	75	80
ttg act tat ggc gat gtc tgc ccg caa gtg ccg atg ggc ggt cgt agt			288
Leu Thr Tyr Gly Asp Val Cys Pro Gln Val Pro Met Gly Gly Arg Ser			
85	90	95	
ttc ttc ttt acc gga cct gaa atg acg gaa agt ga			323
Phe Phe Phe Thr Gly Pro Glu Met Thr Glu Ser			
100	105		
<210> 152			
<211> 107			
<212> PRT			
<213> Actinobacillus actinomycetemcomitans			
<400> 152			
Pro Ser Lys Leu Thr Leu Ala Leu Ala Ile Ala Ser Gly Leu Ser Val			
1	5	10	15
Thr Asn Leu Ser Tyr Ala Thr Asn Asp Thr Ile Gln Ala Gly Asn Gly			
20	25	30	
Ile Ala Val Val Gln Thr Gln Ser Gly Glu Ile Gln Gly Tyr Ile His			
35	40	45	
Asn Asp Ile Leu Thr Tyr Lys Gly Ile Pro Tyr Ala Thr Ala Glu Arg			
50	55	60	
Phe Met Pro Pro Lys Pro Val Glu Asn Trp Gln Gly Thr Lys Met Ala			
65	70	75	80
Leu Thr Tyr Gly Asp Val Cys Pro Gln Val Pro Met Gly Gly Arg Ser			
85	90	95	
Phe Phe Phe Thr Gly Pro Glu Met Thr Glu Ser			
100	105		

<210> 153  
 <211> 177  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1)..(177)

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 ggc ggc ggt gcc tgg gtt cag gcg gat ttg aag atg ttc caa atg cac 48  
 Gly Gly Gly Ala Trp Val Gln Ala Asp Leu Lys Met Phe Gln Met His  
 1 5 10 15  
 agg atg tcg ttt ggt tca tcg gtg gcc gcg caa aat acc ttg aac gtg 96  
 Arg Met Ser Phe Gly Ser Ser Val Ala Ala Gln Asn Thr Leu Asn Val  
 20 25 30  
 gtt gat att tac gcc gtg tca ctc aaa acc atc caa tgt cag ctg aaa 144  
 Val Asp Ile Tyr Ala Val Ser Leu Lys Thr Ile Gln Cys Gln Leu Lys  
 35 40 45  
 gcc att gtg aca gat ttt gat att tcg cac ctt 177  
 Ala Ile Val Thr Asp Phe Asp Ile Ser His Leu  
 50 55

<210> 154  
 <211> 59  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 154  
 Gly Gly Gly Ala Trp Val Gln Ala Asp Leu Lys Met Phe Gln Met His  
 1 5 10 15  
 Arg Met Ser Phe Gly Ser Ser Val Ala Ala Gln Asn Thr Leu Asn Val  
 20 25 30  
 Val Asp Ile Tyr Ala Val Ser Leu Lys Thr Ile Gln Cys Gln Leu Lys  
 35 40 45  
 Ala Ile Val Thr Asp Phe Asp Ile Ser His Leu  
 50 55

<210> 155  
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 <212> DNA  
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<220>

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<221> CDS
<222> (1)..(468)

<400> 155
atg gag aaa aaa caa acc tca cgg gta caa aaa ctg gaa ttt ttg ctc      48
Met Glu Lys Lys Gln Thr Ser Arg Val Gln Lys Leu Glu Phe Leu Leu
1          5          10          15

aaa caa aca gat aaa atc cat ctg cgc gac gcg gca caa atg ctt gat      96
Lys Gln Thr Asp Lys Ile His Leu Arg Asp Ala Ala Gln Met Leu Asp
          20          25          30

gtg tcg gaa atg act tta cgt cgg gat tta agt tcc gac agc ggc aat      144
Val Ser Glu Met Thr Leu Arg Arg Asp Leu Ser Ser Asp Ser Gly Asn
          35          40          45

gtg gtg tta ttg ggc ggc tat atc gtg atg aac cca caa aaa agc ggc      192
Val Val Leu Leu Gly Gly Tyr Ile Val Met Asn Pro Gln Lys Ser Gly
          50          55          60

aat cat tat cag att ttt gac caa caa acg cgc cac att acg gaa aaa      240
Asn His Tyr Gln Ile Phe Asp Gln Gln Thr Arg His Ile Thr Glu Lys
65          70          75          80

atg tgg ctc ggt aaa ctc gcc gcc aat ctc gtc aag gac gga gat acc      288
Met Trp Leu Gly Lys Leu Ala Ala Asn Leu Val Lys Asp Gly Asp Thr
          85          90          95

gtg ttc ttc gat tgc ggt agc acc att ccg ttt atc att tcg caa atc      336
Val Phe Phe Asp Cys Gly Ser Thr Ile Pro Phe Ile Ile Ser Gln Ile
          100          105          110

gat ccg cag ata aaa ttc acc gca ctt ttt tgc tcc atc aat agt ttt      384
Asp Pro Gln Ile Lys Phe Thr Ala Leu Phe Cys Ser Ile Asn Ser Phe
          115          120          125

atg gcg ttg cag gac aaa ccg cac tgc gaa gtg att ctg tgc ggc gga      432
Met Ala Leu Gln Asp Lys Pro His Cys Glu Val Ile Leu Cys Gly Gly
          130          135          140

cat tat tcg cgc cac aat tct ttc ctg act tcc gtg c      469
His Tyr Ser Arg His Asn Ser Phe Leu Thr Ser Val
145          150          155

<210> 156
<211> 156
<212> PRT
<213> Actinobacillus actinomycetemcomitans

<400> 156

Met Glu Lys Lys Gln Thr Ser Arg Val Gln Lys Leu Glu Phe Leu Leu
1          5          10          15

Lys Gln Thr Asp Lys Ile His Leu Arg Asp Ala Ala Gln Met Leu Asp

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20

25

30

Val Ser Glu Met Thr Leu Arg Arg Asp Leu Ser Ser Asp Ser Gly Asn  
 35 40 45

Val Val Leu Leu Gly Gly Tyr Ile Val Met Asn Pro Gln Lys Ser Gly  
 50 55 60

Asn His Tyr Gln Ile Phe Asp Gln Gln Thr Arg His Ile Thr Glu Lys  
 65 70 75 80

Met Trp Leu Gly Lys Leu Ala Ala Asn Leu Val Lys Asp Gly Asp Thr  
 85 90 95

Val Phe Phe Asp Cys Gly Ser Thr Ile Pro Phe Ile Ile Ser Gln Ile  
 100 105 110

Asp Pro Gln Ile Lys Phe Thr Ala Leu Phe Cys Ser Ile Asn Ser Phe  
 115 120 125

Met Ala Leu Gln Asp Lys Pro His Cys Glu Val Ile Leu Cys Gly Gly  
 130 135 140

His Tyr Ser Arg His Asn Ser Phe Leu Thr Ser Val  
 145 150 155

&lt;210&gt; 157

&lt;211&gt; 340

&lt;212&gt; DNA

&lt;213&gt; Actinobacillus actinomycetemcomitans

&lt;220&gt;

&lt;221&gt; CDS

&lt;222&gt; (1)..(339)

&lt;400&gt; 157

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 Met Thr Tyr Pro Gly Gly Lys Gly Lys Cys Phe Gln Lys Ile Ile Asn  
 1 5 10 15

tta atg cct ccg cat gac gta tat att gaa act cat ctt ggt agt ggt 96  
 Leu Met Pro Pro His Asp Val Tyr Ile Glu Thr His Leu Gly Ser Gly  
 20 25 30

gca gta cta cga aat aaa aaa cca gca cta aaa aat att gga ata gat 144  
 Ala Val Leu Arg Asn Lys Lys Pro Ala Leu Lys Asn Ile Gly Ile Asp  
 35 40 45



cta gat ttt gat gtt att caa tca tgg att ggt tat tct cct gaa aat	192
Leu Asp Phe Asp Val Ile Gln Ser Trp Ile Gly Tyr Ser Pro Glu Asn	
50 55 60	

cat aag ttt ttt aat aat gat gca ttg gcg ttt cta act aag tac ctg	240
His Lys Phe Phe Asn Asn Asp Ala Leu Ala Phe Leu Thr Lys Tyr Leu	
65 70 75 80	

ttt act ggg aaa gag tta gta tat tgt gat cct cca tat gtt ctt tca	288
Phe Thr Gly Lys Glu Leu Val Tyr Cys Asp Pro Pro Tyr Val Leu Ser	
85 90 95	

act aga aga aga caa aaa ata tat aaa tat gaa tac act gat gag cag	336
Thr Arg Arg Arg Gln Lys Ile Tyr Lys Tyr Glu Tyr Thr Asp Glu Gln	
100 105 110	

cat g	340
His	

<210> 158  
 <211> 113  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 158

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1 5 10 15

Leu Met Pro Pro His Asp Val Tyr Ile Glu Thr His Leu Gly Ser Gly
20 25 30

Ala Val Leu Arg Asn Lys Lys Pro Ala Leu Lys Asn Ile Gly Ile Asp
35 40 45

Leu Asp Phe Asp Val Ile Gln Ser Trp Ile Gly Tyr Ser Pro Glu Asn
50 55 60

His Lys Phe Phe Asn Asn Asp Ala Leu Ala Phe Leu Thr Lys Tyr Leu
65 70 75 80

Phe Thr Gly Lys Glu Leu Val Tyr Cys Asp Pro Pro Tyr Val Leu Ser
85 90 95

Thr Arg Arg Arg Gln Lys Ile Tyr Lys Tyr Glu Tyr Thr Asp Glu Gln
100 105 110

His

<210> 159  
 <211> 771  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1)..(771)

<400> 159  
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 Ile Asp Ala Phe Phe Ser Arg Gln Asn Asn Gln Phe His Leu Glu Gln  
 1 5 10 15  
 caa agc cat tgc gtt aac caa att atc gag caa tgg cgt tat aac ggg 96  
 Gln Ser His Cys Val Asn Gln Ile Ile Glu Gln Trp Arg Tyr Asn Gly  
 20 25 30  
 caa att atc ggg cgt gaa att ccg caa ttt gtc gcc gaa cag aaa aac 144  
 Gln Ile Ile Gly Arg Glu Ile Pro Gln Phe Val Ala Glu Gln Lys Asn  
 35 40 45  
 caa caa ggc ttg gca gtg cgt gtc acc tgc ccc gag caa acc tct ctt 192  
 Gln Gln Gly Leu Ala Val Arg Val Thr Cys Pro Glu Gln Thr Ser Leu  
 50 55 60  
 tta gcg gaa ttt aac aat caa ccg gtg aac gat gcc ctt caa acg gca 240  
 Leu Ala Glu Phe Asn Asn Gln Pro Val Asn Asp Ala Leu Gln Thr Ala  
 65 70 75 80  
 gaa aag tgc ggt gta tct ttt gag agt ttt cat att gtg gcg gaa gat 288  
 Glu Lys Cys Gly Val Ser Phe Glu Ser Phe His Ile Val Ala Glu Asp  
 85 90 95  
 ctc aat tct gaa atc acc gcc acg gaa aca ccc gct tgg caa ctg ctc 336  
 Leu Asn Ser Glu Ile Thr Ala Thr Glu Thr Pro Ala Trp Gln Leu Leu  
 100 105 110  
 tac acc acc tat ttg cag tct tgt tct ccc ctg caa agc ggt gaa tcc 384  
 Tyr Thr Thr Tyr Leu Gln Ser Cys Ser Pro Leu Gln Ser Gly Glu Ser  
 115 120 125  
 ctg caa ccg att ccg ctg tat aaa caa ctg aaa aac ata ccg cac tta 432  
 Leu Gln Pro Ile Pro Leu Tyr Lys Gln Leu Lys Asn Ile Pro His Leu  
 130 135 140  
 gca atg gat ttg gtt aaa tgg cag gaa aat tgg cag gcg tgc gat caa 480  
 Ala Met Asp Leu Val Lys Trp Gln Glu Asn Trp Gln Ala Cys Asp Gln  
 145 150 155 160  
 ttg caa atg aac ggt tcc gtg ttg gaa caa cag gct ttg gtg caa att 528  
 Leu Gln Met Asn Gly Ser Val Leu Glu Gln Gln Ala Leu Val Gln Ile  
 165 170 175

tca gac acc caa agc acg ctg ttt aag cat ggt tac cat cta acg cag	576
Ser Asp Thr Gln Ser Thr Leu Phe Lys His Gly Tyr His Leu Thr Gln	
180 185 190	

gaa att gag cga cac agc ggc att cct act tac tat tat tta tac cgc	624
Glu Ile Glu Arg His Ser Gly Ile Pro Thr Tyr Tyr Tyr Leu Tyr Arg	
195 200 205	

atc ggt gga aaa agc tgt gaa gcg gag ctg caa tca cgc tgt ccg tta	672
Ile Gly Gly Lys Ser Cys Glu Ala Glu Leu Gln Ser Arg Cys Pro Leu	
210 215 220	

tgt aaa aga aaa tgg acg tta agc cac ccg ctt ttt gac ttc tta tat	720
Cys Lys Arg Lys Trp Thr Leu Ser His Pro Leu Phe Asp Phe Leu Tyr	
225 230 235 240	

ttt aaa tgt gat cat tgt cgc ctc gtt tca aac ctc tca tgg cat tgg	768
Phe Lys Cys Asp His Cys Arg Leu Val Ser Asn Leu Ser Trp His Trp	
245 250 255	

caa	771
Gln	

<210> 160  
 <211> 257  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 160

Ile Asp Ala Phe Phe Ser Arg Gln Asn Asn Gln Phe His Leu Glu Gln
1 5 10 15

Gln Ser His Cys Val Asn Gln Ile Ile Glu Gln Trp Arg Tyr Asn Gly
20 25 30

Gln Ile Ile Gly Arg Glu Ile Pro Gln Phe Val Ala Glu Gln Lys Asn
35 40 45

Gln Gln Gly Leu Ala Val Arg Val Thr Cys Pro Glu Gln Thr Ser Leu
50 55 60

Leu Ala Glu Phe Asn Asn Gln Pro Val Asn Asp Ala Leu Gln Thr Ala
65 70 75 80

Glu Lys Cys Gly Val Ser Phe Glu Ser Phe His Ile Val Ala Glu Asp
85 90 95

Leu Asn Ser Glu Ile Thr Ala Thr Glu Thr Pro Ala Trp Gln Leu Leu

100

105

110

Tyr Thr Thr Tyr Leu Gln Ser Cys Ser Pro Leu Gln Ser Gly Glu Ser  
115 120 125

Leu Gln Pro Ile Pro Leu Tyr Lys Gln Leu Lys Asn Ile Pro His Leu  
130 135 140

Ala Met Asp Leu Val Lys Trp Gln Glu Asn Trp Gln Ala Cys Asp Gln  
145 150 155 160

Leu Gln Met Asn Gly Ser Val Leu Glu Gln Gln Ala Leu Val Gln Ile  
165 170 175

Ser Asp Thr Gln Ser Thr Leu Phe Lys His Gly Tyr His Leu Thr Gln  
180 185 190

Glu Ile Glu Arg His Ser Gly Ile Pro Thr Tyr Tyr Tyr Leu Tyr Arg  
195 200 205

Ile Gly Gly Lys Ser Cys Glu Ala Glu Leu Gln Ser Arg Cys Pro Leu  
210 215 220

Cys Lys Arg Lys Trp Thr Leu Ser His Pro Leu Phe Asp Phe Leu Tyr  
225 230 235 240

Phe Lys Cys Asp His Cys Arg Leu Val Ser Asn Leu Ser Trp His Trp  
245 250 255

Gln

&lt;210&gt; 161

&lt;211&gt; 330

&lt;212&gt; DNA

&lt;213&gt; Actinobacillus actinomycetemcomitans

&lt;220&gt;

&lt;221&gt; CDS

&lt;222&gt; (1)..(330)

&lt;400&gt; 161

gag gcg gat aaa ttt aaa gtg gat att ccg tct atg gca aga ctg aga  
Glu Ala Asp Lys Phe Lys Val Asp Ile Pro Ser Met Ala Arg Leu Arg  
1 5 10 15

48

atc agc ccg aat atc gac atc agt gcg aca ccg aag ctg ttg gaa ctt	96
Ile Ser Pro Asn Ile Asp Ile Ser Ala Thr Pro Lys Leu Leu Glu Leu	
20 25 30	
tcc ggc aat att gat att ccc tgg gcg cgc att gcc att gaa aac ctg	144
Ser Gly Asn Ile Asp Ile Pro Trp Ala Arg Ile Ala Ile Glu Asn Leu	
35 40 45	
ccg gac agt gca gtg gcg gtc agc tcc gat gaa gtg att tta aat ggc	192
Pro Asp Ser Ala Val Ala Val Ser Ser Asp Glu Val Ile Leu Asn Gly	
50 55 60	
aat aag aag agt act ctg ccg aaa aca ttg ccg agc gaa acc caa agc	240
Asn Lys Lys Ser Thr Leu Pro Lys Thr Leu Pro Ser Glu Thr Gln Ser	
65 70 75 80	
ggc atg gca att cgt tct gat tta aga atc aat atc ggc gat gat gtc	288
Gly Met Ala Ile Arg Ser Asp Leu Arg Ile Asn Ile Gly Asp Asp Val	
85 90 95	
agt tta aat gcc tat ggc ttg aaa acc cat ctc cac ggg ttg	330
Ser Leu Asn Ala Tyr Gly Leu Lys Thr His Leu His Gly Leu	
100 105 110	
<210> 162	
<211> 110	
<212> PRT	
<213> Actinobacillus actinomycetemcomitans	
<400> 162	
Glu Ala Asp Lys Phe Lys Val Asp Ile Pro Ser Met Ala Arg Leu Arg	
1 5 10 15	
Ile Ser Pro Asn Ile Asp Ile Ser Ala Thr Pro Lys Leu Leu Glu Leu	
20 25 30	
Ser Gly Asn Ile Asp Ile Pro Trp Ala Arg Ile Ala Ile Glu Asn Leu	
35 40 45	
Pro Asp Ser Ala Val Ala Val Ser Ser Asp Glu Val Ile Leu Asn Gly	
50 55 60	
Asn Lys Lys Ser Thr Leu Pro Lys Thr Leu Pro Ser Glu Thr Gln Ser	
65 70 75 80	
Gly Met Ala Ile Arg Ser Asp Leu Arg Ile Asn Ile Gly Asp Asp Val	
85 90 95	
Ser Leu Asn Ala Tyr Gly Leu Lys Thr His Leu His Gly Leu	

100

105

110

<210> 163  
 <211> 625  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1)..(624)

<400> 163  
 gat aag aca gaa acg atg caa caa aat gaa gaa aaa atc acg ccg tca 48  
 Asp Lys Thr Glu Thr Met Gln Gln Asn Glu Glu Lys Ile Thr Pro Ser  
 1 5 10 15

gag caa aaa ccg atc gtg cat gaa acc gtt gtg gtg aag aaa acc ggt 96  
 Glu Gln Lys Pro Ile Val His Glu Thr Val Val Val Lys Lys Thr Gly  
 20 25 30

tcc gcg tta ggt ttg ctg gca ctt tta att gcg ttg ggt tta ggc ggc 144  
 Ser Ala Leu Gly Leu Leu Ala Leu Leu Ile Ala Leu Gly Leu Gly Gly  
 35 40 45

gcg ggc tat tat ttc ggt cag cta cag gtt gac gaa ata cag caa aaa 192  
 Ala Gly Tyr Tyr Phe Gly Gln Leu Gln Val Asp Glu Ile Gln Gln Lys  
 50 55 60

ctg acc gca ctt gaa aac caa ttg caa caa aaa ggc act tcc gcc gat 240  
 Leu Thr Ala Leu Glu Asn Gln Leu Gln Gln Lys Gly Thr Ser Ala Asp  
 65 70 75 80

gtt gcc ggc atg ccg gat ttt agt gca gag aaa aat cag ctg gcg aaa 288  
 Val Ala Gly Met Pro Asp Phe Ser Ala Glu Lys Asn Gln Leu Ala Lys  
 85 90 95

tta acg gaa ttt tcc caa gtg gca agt gat caa atc agc gcc ttg aat 336  
 Leu Thr Glu Phe Ser Gln Val Ala Ser Asp Gln Ile Ser Ala Leu Asn  
 100 105 110

cag aat ttg tcc gcc aaa gaa caa agc ctg tcg gca ttg caa caa cag 384  
 Gln Asn Leu Ser Ala Lys Glu Gln Ser Leu Ser Ala Leu Gln Gln Gln  
 115 120 125

gtg caa cgt ttg tcc aat caa gcc aaa gcg gag cag ccg aat gac tgg 432  
 Val Gln Arg Leu Ser Asn Gln Ala Lys Ala Glu Gln Pro Asn Asp Trp  
 130 135 140

tta ctg acc gaa gcg gat ttt ctg tta aat aac gct ttg cgc aaa ctg 480  
 Leu Leu Thr Glu Ala Asp Phe Leu Leu Asn Asn Ala Leu Arg Lys Leu  
 145 150 155 160

gtg ttg gat aac gac gtg gat acc agt gtg tcc ttg ttg aaa gtt gcc 528  
 Val Leu Asp Asn Asp Val Asp Thr Ser Val Ser Leu Leu Lys Val Ala  
 165 170 175

gat gaa acc ctt tcc aaa gtc gcc atg cca caa gtg gcg cag gtg cgt 576  
 Asp Glu Thr Leu Ser Lys Val Ala Met Pro Gln Val Ala Gln Val Arg  
 180 185 190

agc gcc att aac gcc gat tta aaa cag ttg ttg tcc ctg aac aat gtg g 625  
 Ser Ala Ile Asn Ala Asp Leu Lys Gln Leu Leu Ser Leu Asn Asn Val  
 195 200 205

<210> 164  
 <211> 208  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 164

Asp Lys Thr Glu Thr Met Gln Gln Asn Glu Glu Lys Ile Thr Pro Ser  
 1 5 10 15

Glu Gln Lys Pro Ile Val His Glu Thr Val Val Val Lys Lys Thr Gly  
 20 25 30

Ser Ala Leu Gly Leu Leu Ala Leu Leu Ile Ala Leu Gly Leu Gly Gly  
 35 40 45

Ala Gly Tyr Tyr Phe Gly Gln Leu Gln Val Asp Glu Ile Gln Gln Lys  
 50 55 60

Leu Thr Ala Leu Glu Asn Gln Leu Gln Gln Lys Gly Thr Ser Ala Asp  
 65 70 75 80

Val Ala Gly Met Pro Asp Phe Ser Ala Glu Lys Asn Gln Leu Ala Lys  
 85 90 95

Leu Thr Glu Phe Ser Gln Val Ala Ser Asp Gln Ile Ser Ala Leu Asn  
 100 105 110

Gln Asn Leu Ser Ala Lys Glu Gln Ser Leu Ser Ala Leu Gln Gln Gln  
 115 120 125

Val Gln Arg Leu Ser Asn Gln Ala Lys Ala Glu Gln Pro Asn Asp Trp  
 130 135 140

Leu Leu Thr Glu Ala Asp Phe Leu Leu Asn Asn Ala Leu Arg Lys Leu  
 145 150 155 160

Val Leu Asp Asn Asp Val Asp Thr Ser Val Ser Leu Leu Lys Val Ala

165	170	175
Asp Glu Thr Leu Ser Lys Val Ala Met Pro Gln Val Ala Gln Val Arg		
180	185	190
Ser Ala Ile Asn Ala Asp Leu Lys Gln Leu Leu Ser Leu Asn Asn Val		
195	200	205

<210> 165  
 <211> 684  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1)..(684)

<400> 165	
atg acg att tta gtt ctg ggt atc aat cac aaa act gct tcc gtg gca	48
Met Thr Ile Leu Val Leu Gly Ile Asn His Lys Thr Ala Ser Val Ala	
1 5 10 15	
ttg cgg gaa aag gtg gcg ttt tcc gac gaa aag cgc act ttt gct ttg	96
Leu Arg Glu Lys Val Ala Phe Ser Asp Glu Lys Arg Thr Phe Ala Leu	
20 25 30	
cgt cac att caa caa acg cag ttg gcg gaa agt gcg gtg att tta tcc	144
Arg His Ile Gln Gln Thr Gln Leu Ala Glu Ser Ala Val Ile Leu Ser	
35 40 45	
acc tgt aat cgc acg gaa gtt tat ctg cac aat aaa agc gtt ccg ccg	192
Thr Cys Asn Arg Thr Glu Val Tyr Leu His Asn Lys Ser Val Pro Pro	
50 55 60	
caa gag acg caa acc tgg atc aca ctg gcg gtg cag tgg ttt gcc ggc	240
Gln Glu Thr Gln Thr Trp Ile Thr Leu Ala Val Gln Trp Phe Ala Gly	
65 70 75 80	
att cat caa cta gcg ttg gcg gag ctg cag cac tgt gtt tat act cac	288
Ile His Gln Leu Ala Leu Ala Glu Leu Gln His Cys Val Tyr Thr His	
85 90 95	
gaa aat ctt cag gcg gcg aat cat tta atg gaa gtg gcg tgc ggt ttg	336
Glu Asn Leu Gln Ala Ala Asn His Leu Met Glu Val Ala Cys Gly Leu	
100 105 110	
gat tcg ctg att tta ggc gaa ccg cag att ttg ggg cag gtg aag caa	384
Asp Ser Leu Ile Leu Gly Glu Pro Gln Ile Leu Gly Gln Val Lys Gln	
115 120 125	
gcc tac cac atg agc gag cag cat tat caa cag gaa ggg caa acc att	432
Ala Tyr His Met Ser Glu Gln His Tyr Gln Gln Glu Gly Gln Thr Ile	
130 135 140	





100	105	110
Asp Ser Leu Ile Leu Gly Glu Pro Gln Ile Leu Gly Gln Val Lys Gln		
115	120	125
Ala Tyr His Met Ser Glu Gln His Tyr Gln Gln Glu Gly Gln Thr Ile		
130	135	140
Ser Gly Glu Leu Ser Arg Leu Phe Gln Lys Thr Phe Ala Thr Ala Lys		
145	150	155
Arg Val Arg Thr Glu Thr Asn Ile Gly Glu Ser Ala Val Ser Val Ala		
165	170	175
Tyr Ala Ala Cys Ser Leu Ala Arg Gln Ile Phe Glu Ser Leu Arg Asp		
180	185	190
Leu Thr Ile Leu Leu Val Gly Ala Gly Glu Thr Ile Glu Leu Val Asn		
195	200	205
Arg His Leu Leu Arg His Gly Val Lys Asn Leu Phe Ile Ala Asn Arg		
210	215	220
Thr Leu Ala Arg		
225		

<210> 167  
 <211> 138  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1)..(138)

<400> 167	
atg cgc cgt tgg aag ctg aaa atc ttc cgc aaa atg aac cgc act ttg	48
Met Arg Arg Trp Lys Leu Lys Ile Phe Arg Lys Met Asn Arg Thr Leu	
1 5 10 15	
cgc gtt cgc ctt tcg ttc cca atg cac cga ttc gtg ccg gac ctt aat	96
Arg Val Arg Leu Ser Phe Pro Met His Arg Phe Val Pro Asp Leu Asn	
20 25 30	
tta ttt aac ttc gat ctt tgt ata ttc cgt cgt tta att cgt	138
Leu Phe Asn Phe Asp Leu Cys Ile Phe Arg Arg Leu Ile Arg	
35 40 45	

<210> 168  
 <211> 46  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 168

Met Arg Arg Trp Lys Leu Lys Ile Phe Arg Lys Met Asn Arg Thr Leu  
 1 5 10 15

Arg Val Arg Leu Ser Phe Pro Met His Arg Phe Val Pro Asp Leu Asn  
 20 25 30

Leu Phe Asn Phe Asp Leu Cys Ile Phe Arg Arg Leu Ile Arg  
 35 40 45

<210> 169  
 <211> 1950  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1)..(1950)

<400> 169

atg gct gat gta tta acc cgt ttc aac agt ggc aag ctt tgg gaa ttc 48  
 Met Ala Asp Val Leu Thr Arg Phe Asn Ser Gly Lys Leu Trp Glu Phe  
 1 5 10 15

gat ggc ggc att cat ccg ccc gac atg aaa tcc caa tcc aac cgc gcg 96  
 Asp Gly Gly Ile His Pro Pro Asp Met Lys Ser Gln Ser Asn Arg Ala  
 20 25 30

cct att cgt acc ttg ccg ttg ccc gat aat ttc tac gtt ctt ctg aaa 144  
 Pro Ile Arg Thr Leu Pro Leu Pro Asp Asn Phe Tyr Val Leu Leu Lys  
 35 40 45

caa cac gcc ggc aca gcg ggc aat tta ttg gta aaa tgc ggc gat cat 192  
 Gln His Ala Gly Thr Ala Gly Asn Leu Leu Val Lys Cys Gly Asp His  
 50 55 60

gtt ttg aaa ggt caa ccg ctc acc cag ggg gac ggt ttg cgt tcg ctg 240  
 Val Leu Lys Gly Gln Pro Leu Thr Gln Gly Asp Gly Leu Arg Ser Leu  
 65 70 75 80

ccg gtt cat gcg cct act tca ggc acg gtc att gat gtg atg cct tat 288  
 Pro Val His Ala Pro Thr Ser Gly Thr Val Ile Asp Val Met Pro Tyr  
 85 90 95

gtc acc gcc cat cct tcc ggt cta ccg gaa acc tgt gtg cat att aaa 336  
 Val Thr Ala His Pro Ser Gly Leu Pro Glu Thr Cys Val His Ile Lys  
 100 105 110

gcg gat gga tta gat caa tgg cgc gag caa acc ccg ttg gag gat ttc	384
Ala Asp Gly Leu Asp Gln Trp Arg Glu Gln Thr Pro Leu Glu Asp Phe	
115 120 125	
ctt agc caa acg ccg gaa cag tta atc gaa aaa att tat cag gcg ggc	432
Leu Ser Gln Thr Pro Glu Gln Leu Ile Glu Lys Ile Tyr Gln Ala Gly	
130 135 140	
att gcc ggt ctg ggt ggc gcg gta ttc ccg acc gcg gca aaa att cat	480
Ile Ala Gly Leu Gly Gly Ala Val Phe Pro Thr Ala Ala Lys Ile His	
145 150 155 160	
tcc gcc gag aaa cag gtg aaa tta ctg att att aac ggc gcg gaa tgt	528
Ser Ala Glu Lys Gln Val Lys Leu Leu Ile Ile Asn Gly Ala Glu Cys	
165 170 175	
gaa cct tac att acc tgc gac gat cgc tta atg cat gat tat gct gat	576
Glu Pro Tyr Ile Thr Cys Asp Asp Arg Leu Met His Asp Tyr Ala Asp	
180 185 190	
gaa att atc gaa ggc gtg cgt att ttg cgc tac att tta cgc cct gag	624
Glu Ile Ile Glu Gly Val Arg Ile Leu Arg Tyr Ile Leu Arg Pro Glu	
195 200 205	
aaa gtg gtg atc gcc gtt gaa gat aat aaa cca aaa gcg gtg aaa tcc	672
Lys Val Val Ile Ala Val Glu Asp Asn Lys Pro Lys Ala Val Lys Ser	
210 215 220	
ttg gaa cgc gcc tta cac ggc gcc aac gat att gaa atc cga gtg att	720
Leu Glu Arg Ala Leu His Gly Ala Asn Asp Ile Glu Ile Arg Val Ile	
225 230 235 240	
ccg acc aaa tac cct tcc ggc gcg gca aaa cag tta att caa gtg ctg	768
Pro Thr Lys Tyr Pro Ser Gly Ala Ala Lys Gln Leu Ile Gln Val Leu	
245 250 255	
acc ggc atg gag gta cct agc ggt caa cgc tcc tcc ggt atc ggc gtg	816
Thr Gly Met Glu Val Pro Ser Gly Gln Arg Ser Ser Gly Ile Gly Val	
260 265 270	
ctg atg caa aac atc ggc acc gct ttt gct att aaa cgc gca gtg atg	864
Leu Met Gln Asn Ile Gly Thr Ala Phe Ala Ile Lys Arg Ala Val Met	
275 280 285	
gat gat gaa ccg ctg att gag cgc gtc gtc acc ctc acc ggt gat aaa	912
Asp Asp Glu Pro Leu Ile Glu Arg Val Val Thr Leu Thr Gly Asp Lys	
290 295 300	
atc gcc gat aaa ggc aac tat tgg gcg cgt ttt gga acg ccg att tat	960
Ile Ala Asp Lys Gly Asn Tyr Trp Ala Arg Phe Gly Thr Pro Ile Tyr	
305 310 315 320	
cac ttg ttg cgc gaa acg ggc tat caa tac gac gat cgt ttc ccg gtc	1008
His Leu Leu Arg Glu Thr Gly Tyr Gln Tyr Asp Asp Arg Phe Pro Val	
325 330 335	

ttc atg ggc ggt ccg atg atg ggc ttt att ctg ccc gat tta aat gcg	1056
Phe Met Gly Gly Pro Met Met Gly Phe Ile Leu Pro Asp Leu Asn Ala	
340 345 350	
ccg atg acc aaa gtg acc aac tgc ctg ttg gcg ccg gat cat ttt gaa	1104
Pro Met Thr Lys Val Thr Asn Cys Leu Leu Ala Pro Asp His Phe Glu	
355 360 365	
tac gcc ccg ccg gaa gaa gaa aaa aat tgt att cgc tgt tct gcc tgt	1152
Tyr Ala Pro Pro Glu Glu Glu Lys Asn Cys Ile Arg Cys Ser Ala Cys	
370 375 380	
tcc gat gcc tgc ccg gtg aaa ctc atg ccg cag caa ttg tat tgg ttt	1200
Ser Asp Ala Cys Pro Val Lys Leu Met Pro Gln Gln Leu Tyr Trp Phe	
385 390 395 400	
gca cgc agc gaa gat cac gaa aaa tcg gaa gaa tat tcc ctc aaa gat	1248
Ala Arg Ser Glu Asp His Glu Lys Ser Glu Glu Tyr Ser Leu Lys Asp	
405 410 415	
tgt att gaa tgc ggc gtg tgc gct tat gtt tgc cca agt cac att ccg	1296
Cys Ile Glu Cys Gly Val Cys Ala Tyr Val Cys Pro Ser His Ile Pro	
420 425 430	
tta att caa tat ttc cgc cgg gaa aaa gct aaa atc tgg gaa atc aaa	1344
Leu Ile Gln Tyr Phe Arg Arg Glu Lys Ala Lys Ile Trp Glu Ile Lys	
435 440 445	
cac aaa gcc aaa ttg gcg gaa gaa gct aaa ata cgt ttt gaa caa cgc	1392
His Lys Ala Lys Leu Ala Glu Glu Ala Lys Ile Arg Phe Glu Gln Arg	
450 455 460	
caa gcc cgt ttg gaa cgg gaa gaa cag gaa cgc aaa gat cgc tca caa	1440
Gln Ala Arg Leu Glu Arg Glu Glu Gln Glu Arg Lys Asp Arg Ser Gln	
465 470 475 480	
cgt gct gca gcc gcc cgt cgt gaa gaa ttg gcg caa caa aaa ggc gtg	1488
Arg Ala Ala Ala Ala Arg Arg Glu Glu Leu Ala Gln Gln Lys Gly Val	
485 490 495	
gat ccg gtg gct gcc gcc tta gcg cgc tta aaa gcg aaa aaa gcc gaa	1536
Asp Pro Val Ala Ala Ala Leu Ala Arg Leu Lys Ala Lys Lys Ala Glu	
500 505 510	
acg acg gaa gct acg cag gca gaa cag aaa acc att gtt gac gaa aaa	1584
Thr Thr Glu Ala Thr Gln Ala Glu Gln Lys Thr Ile Val Asp Glu Lys	
515 520 525	
ggc cat atc ctg cct gac aac agc gac atc atg gca caa cgc aaa gcc	1632
Gly His Ile Leu Pro Asp Asn Ser Asp Ile Met Ala Gln Arg Lys Ala	
530 535 540	
cgt cgt tta gcc cgt cag gcg gaa gcg gca cac tcg ccg tcg cag aaa	1680
Arg Arg Leu Ala Arg Gln Ala Glu Ala Ala His Ser Pro Ser Gln Lys	
545 550 555 560	
aca gaa aaa acg cta gaa aaa acg cta gaa aaa acc acc gca ctt gag	1728

Thr	Glu	Lys	Thr	Leu	Glu	Lys	Thr	Leu	Glu	Lys	Thr	Thr	Ala	Leu	Glu		
				565					570					575			
gat	aaa	aaa	tct	acc	gtt	gcc	gcc	gcc	att	gcc	cgt	gcg	aaa	gcc	aag	1776	
Asp	Lys	Lys	Ser	Thr	Val	Ala	Ala	Ala	Ile	Ala	Arg	Ala	Lys	Ala	Lys		
			580					585					590				
aaa	gcg	gcg	cag	caa	acg	gaa	gcc	gtc	gaa	gca	aac	gaa	cct	gaa	acg	1824	
Lys	Ala	Ala	Gln	Gln	Thr	Glu	Ala	Val	Glu	Ala	Asn	Glu	Pro	Glu	Thr		
			595				600					605					
gca	aaa	agt	gcg	gtc	aat	att	tcc	ggg	gaa	aat	ggc	gca	gag	aac	gat	1872	
Ala	Lys	Ser	Ala	Val	Asn	Ile	Ser	Gly	Glu	Asn	Gly	Ala	Glu	Asn	Asp		
	610					615					620						
ccg	cgc	aaa	gcc	gct	gtt	gcc	gcc	gct	att	gcc	cgt	gcg	aaa	gcg	aag	1920	
Pro	Arg	Lys	Ala	Ala	Val	Ala	Ala	Ala	Ile	Ala	Arg	Ala	Lys	Ala	Lys		
	625				630					635				640			
aaa	gcc	caa	cgt	gaa	aac	acg	caa	caa	gat							1950	
Lys	Ala	Gln	Arg	Glu	Asn	Thr	Gln	Gln	Asp								
				645				650									
<210>	170																
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<212>	PRT																
<213>	Actinobacillus actinomycetemcomitans																
<400>	170																
Met	Ala	Asp	Val	Leu	Thr	Arg	Phe	Asn	Ser	Gly	Lys	Leu	Trp	Glu	Phe		
1				5					10					15			
Asp	Gly	Gly	Ile	His	Pro	Pro	Asp	Met	Lys	Ser	Gln	Ser	Asn	Arg	Ala		
			20					25					30				
Pro	Ile	Arg	Thr	Leu	Pro	Leu	Pro	Asp	Asn	Phe	Tyr	Val	Leu	Leu	Lys		
		35					40					45					
Gln	His	Ala	Gly	Thr	Ala	Gly	Asn	Leu	Leu	Val	Lys	Cys	Gly	Asp	His		
	50					55					60						
Val	Leu	Lys	Gly	Gln	Pro	Leu	Thr	Gln	Gly	Asp	Gly	Leu	Arg	Ser	Leu		
65					70					75					80		
Pro	Val	His	Ala	Pro	Thr	Ser	Gly	Thr	Val	Ile	Asp	Val	Met	Pro	Tyr		
				85					90					95			
Val	Thr	Ala	His	Pro	Ser	Gly	Leu	Pro	Glu	Thr	Cys	Val	His	Ile	Lys		
			100					105					110				

Ala Asp Gly Leu Asp Gln Trp Arg Glu Gln Thr Pro Leu Glu Asp Phe  
115 120 125

Leu Ser Gln Thr Pro Glu Gln Leu Ile Glu Lys Ile Tyr Gln Ala Gly  
130 135 140

Ile Ala Gly Leu Gly Gly Ala Val Phe Pro Thr Ala Ala Lys Ile His  
145 150 155 160

Ser Ala Glu Lys Gln Val Lys Leu Leu Ile Ile Asn Gly Ala Glu Cys  
165 170 175

Glu Pro Tyr Ile Thr Cys Asp Asp Arg Leu Met His Asp Tyr Ala Asp  
180 185 190

Glu Ile Ile Glu Gly Val Arg Ile Leu Arg Tyr Ile Leu Arg Pro Glu  
195 200 205

Lys Val Val Ile Ala Val Glu Asp Asn Lys Pro Lys Ala Val Lys Ser  
210 215 220

Leu Glu Arg Ala Leu His Gly Ala Asn Asp Ile Glu Ile Arg Val Ile  
225 230 235 240

Pro Thr Lys Tyr Pro Ser Gly Ala Ala Lys Gln Leu Ile Gln Val Leu  
245 250 255

Thr Gly Met Glu Val Pro Ser Gly Gln Arg Ser Ser Gly Ile Gly Val  
260 265 270

Leu Met Gln Asn Ile Gly Thr Ala Phe Ala Ile Lys Arg Ala Val Met  
275 280 285

Asp Asp Glu Pro Leu Ile Glu Arg Val Val Thr Leu Thr Gly Asp Lys  
290 295 300

Ile Ala Asp Lys Gly Asn Tyr Trp Ala Arg Phe Gly Thr Pro Ile Tyr  
305 310 315 320

His Leu Leu Arg Glu Thr Gly Tyr Gln Tyr Asp Asp Arg Phe Pro Val  
325 330 335

Phe Met Gly Gly Pro Met Met Gly Phe Ile Leu Pro Asp Leu Asn Ala  
 340 345 350

Pro Met Thr Lys Val Thr Asn Cys Leu Leu Ala Pro Asp His Phe Glu  
 355 360 365

Tyr Ala Pro Pro Glu Glu Glu Lys Asn Cys Ile Arg Cys Ser Ala Cys  
 370 375 380

Ser Asp Ala Cys Pro Val Lys Leu Met Pro Gln Gln Leu Tyr Trp Phe  
 385 390 395 400

Ala Arg Ser Glu Asp His Glu Lys Ser Glu Glu Tyr Ser Leu Lys Asp  
 405 410 415

Cys Ile Glu Cys Gly Val Cys Ala Tyr Val Cys Pro Ser His Ile Pro  
 420 425 430

Leu Ile Gln Tyr Phe Arg Arg Glu Lys Ala Lys Ile Trp Glu Ile Lys  
 435 440 445

His Lys Ala Lys Leu Ala Glu Glu Ala Lys Ile Arg Phe Glu Gln Arg  
 450 455 460

Gln Ala Arg Leu Glu Arg Glu Glu Gln Glu Arg Lys Asp Arg Ser Gln  
 465 470 475 480

Arg Ala Ala Ala Ala Arg Arg Glu Glu Leu Ala Gln Gln Lys Gly Val  
 485 490 495

Asp Pro Val Ala Ala Ala Leu Ala Arg Leu Lys Ala Lys Lys Ala Glu  
 500 505 510

Thr Thr Glu Ala Thr Gln Ala Glu Gln Lys Thr Ile Val Asp Glu Lys  
 515 520 525

Gly His Ile Leu Pro Asp Asn Ser Asp Ile Met Ala Gln Arg Lys Ala  
 530 535 540

Arg Arg Leu Ala Arg Gln Ala Glu Ala Ala His Ser Pro Ser Gln Lys  
 545 550 555 560



Thr Glu Lys Thr Leu Glu Lys Thr Leu Glu Lys Thr Thr Ala Leu Glu  
565 570 575

Asp Lys Lys Ser Thr Val Ala Ala Ala Ile Ala Arg Ala Lys Ala Lys  
580 585 590

Lys Ala Ala Gln Gln Thr Glu Ala Val Glu Ala Asn Glu Pro Glu Thr  
595 600 605

Ala Lys Ser Ala Val Asn Ile Ser Gly Glu Asn Gly Ala Glu Asn Asp  
610 615 620

Pro Arg Lys Ala Ala Val Ala Ala Ala Ile Ala Arg Ala Lys Ala Lys  
625 630 635 640

Lys Ala Gln Arg Glu Asn Thr Gln Gln Asp  
645 650

<210> 171

<211> 525

<212> DNA

<213> Actinobacillus actinomycetemcomitans

<220>

<221> CDS

<222> (1) .. (525)

<400> 171

atg aag ttt aaa acg cta ctt ggc gcg ctc tta ttg agc gtg ttt tcc 48  
Met Lys Phe Lys Thr Leu Leu Gly Ala Leu Leu Leu Ser Val Phe Ser  
1 5 10 15

act tcc gtt tgg gct gat cgc gtg att acc gat caa ctt gat cga caa 96  
Thr Ser Val Trp Ala Asp Arg Val Ile Thr Asp Gln Leu Asp Arg Gln  
20 25 30

gtg acc atc ccc gac cat att cat cgc gct gtg ata tta cag cac cag 144  
Val Thr Ile Pro Asp His Ile His Arg Ala Val Ile Leu Gln His Gln  
35 40 45

acc tta aat ctc gcg gtg caa ctg gat gcc acc aaa caa att gcg ggc 192  
Thr Leu Asn Leu Ala Val Gln Leu Asp Ala Thr Lys Gln Ile Ala Gly  
50 55 60

gtg ctt tcc aac tgg caa aaa cag ctg ggc aaa gac ttc gtg cgc ctt 240  
Val Leu Ser Asn Trp Gln Lys Gln Leu Gly Lys Asp Phe Val Arg Leu  
65 70 75 80

gcg ccg gaa ttg gca aat tta ccg atg ccc ggt gat ttg aat acg gtc 288  
Ala Pro Glu Leu Ala Asn Leu Pro Met Pro Gly Asp Leu Asn Thr Val  
85 90 95

aat att gaa agc cta atg gaa atc aaa ccg gat gtt gtt ttc gtg acc	336
Asn Ile Glu Ser Leu Met Glu Ile Lys Pro Asp Val Val Phe Val Thr	
100 105 110	

aat tac gcg ccg aaa gaa atg att gaa aaa atc agc caa atg aac gtg	384
Asn Tyr Ala Pro Lys Glu Met Ile Glu Lys Ile Ser Gln Met Asn Val	
115 120 125	

ccg gtg att gcc att tcg tta cgc agc ggc gat aaa acc gaa caa agc	432
Pro Val Ile Ala Ile Ser Leu Arg Ser Gly Asp Lys Thr Glu Gln Ser	
130 135 140	

aaa ctc aac ccg acc ctt gcc gat gaa aac aat gcc tac aac gaa ggg	480
Lys Leu Asn Pro Thr Leu Ala Asp Glu Asn Asn Ala Tyr Asn Glu Gly	
145 150 155 160	

tta aaa cgc ggg att gaa att att gcc gat gtt ttt gat aaa aaa	525
Leu Lys Arg Gly Ile Glu Ile Ile Ala Asp Val Phe Asp Lys Lys	
165 170 175	

<210> 172  
 <211> 175  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 172

Met Lys Phe Lys Thr Leu Leu Gly Ala Leu Leu Leu Ser Val Phe Ser
1 5 10 15

Thr Ser Val Trp Ala Asp Arg Val Ile Thr Asp Gln Leu Asp Arg Gln
20 25 30

Val Thr Ile Pro Asp His Ile His Arg Ala Val Ile Leu Gln His Gln
35 40 45

Thr Leu Asn Leu Ala Val Gln Leu Asp Ala Thr Lys Gln Ile Ala Gly
50 55 60

Val Leu Ser Asn Trp Gln Lys Gln Leu Gly Lys Asp Phe Val Arg Leu
65 70 75 80

Ala Pro Glu Leu Ala Asn Leu Pro Met Pro Gly Asp Leu Asn Thr Val
85 90 95

Asn Ile Glu Ser Leu Met Glu Ile Lys Pro Asp Val Val Phe Val Thr
100 105 110

Asn Tyr Ala Pro Lys Glu Met Ile Glu Lys Ile Ser Gln Met Asn Val  
 115 120 125

Pro Val Ile Ala Ile Ser Leu Arg Ser Gly Asp Lys Thr Glu Gln Ser  
 130 135 140

Lys Leu Asn Pro Thr Leu Ala Asp Glu Asn Asn Ala Tyr Asn Glu Gly  
 145 150 155 160

Leu Lys Arg Gly Ile Glu Ile Ile Ala Asp Val Phe Asp Lys Lys  
 165 170 175

<210> 173  
 <211> 391  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
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 <222> (1) .. (390)

<400> 173  
 atg gcg gag ttg gtg tat aaa ccg ctt gag caa cct gtg gaa gca cca 48  
 Met Ala Glu Leu Val Tyr Lys Pro Leu Glu Gln Pro Val Glu Ala Pro  
 1 5 10 15

aat ccg aat cta aaa att gaa gcg gta aac gaa cag ttt gcg gca aaa 96  
 Asn Pro Asn Leu Lys Ile Glu Ala Val Asn Glu Gln Phe Ala Ala Lys  
 20 25 30

tac ccg aaa caa ttt gcg tct tgg aaa gcc acc gaa aaa ggc gac aag 144  
 Tyr Pro Lys Gln Phe Ala Ser Trp Lys Ala Thr Glu Lys Gly Asp Lys  
 35 40 45

att att tat gca gat gag gaa aat cca cgt tta atc ata tta tgg ggc 192  
 Ile Ile Tyr Ala Asp Glu Glu Asn Pro Arg Leu Ile Ile Leu Trp Gly  
 50 55 60

ggc tat gcc ttt gcg aaa gaa tat aac gca ccg cgc gga cac att tat 240  
 Gly Tyr Ala Phe Ala Lys Glu Tyr Asn Ala Pro Arg Gly His Ile Tyr  
 65 70 75 80

gcc att aaa gat tta cgc aat att ttg cgt acc ggt gcg ccg aaa acc 288  
 Ala Ile Lys Asp Leu Arg Asn Ile Leu Arg Thr Gly Ala Pro Lys Thr  
 85 90 95

gct aac gac ggt cca caa ccg atg gcg tgt tgg acc tgt aaa ggt ccg 336  
 Ala Asn Asp Gly Pro Gln Pro Met Ala Cys Trp Thr Cys Lys Gly Pro  
 100 105 110

gat gtg ccg cgt tta atc gcc gaa tgg gga gaa gaa ggc tat ttc aat 384  
 Asp Val Pro Arg Leu Ile Ala Glu Trp Gly Glu Glu Gly Tyr Phe Asn  
 115 120 125

ggt aaa t  
Gly Lys  
130

391

<210> 174  
<211> 130  
<212> PRT  
<213> Actinobacillus actinomycetemcomitans  
  
<400> 174

Met Ala Glu Leu Val Tyr Lys Pro Leu Glu Gln Pro Val Glu Ala Pro  
1 5 10 15

Asn Pro Asn Leu Lys Ile Glu Ala Val Asn Glu Gln Phe Ala Ala Lys  
20 25 30

Tyr Pro Lys Gln Phe Ala Ser Trp Lys Ala Thr Glu Lys Gly Asp Lys  
35 40 45

Ile Ile Tyr Ala Asp Glu Glu Asn Pro Arg Leu Ile Ile Leu Trp Gly  
50 55 60

Gly Tyr Ala Phe Ala Lys Glu Tyr Asn Ala Pro Arg Gly His Ile Tyr  
65 70 75 80

Ala Ile Lys Asp Leu Arg Asn Ile Leu Arg Thr Gly Ala Pro Lys Thr  
85 90 95

Ala Asn Asp Gly Pro Gln Pro Met Ala Cys Trp Thr Cys Lys Gly Pro  
100 105 110

Asp Val Pro Arg Leu Ile Ala Glu Trp Gly Glu Glu Gly Tyr Phe Asn  
115 120 125

Gly Lys  
130

<210> 175  
<211> 540  
<212> DNA  
<213> Actinobacillus actinomycetemcomitans

<220>  
<221> CDS  
<222> (1)..(540)

<400> 175  
 aaa gcc atg ccg gca tta gac tta aat aaa gac ggc aaa atc caa tat 48  
 Lys Ala Met Pro Ala Leu Asp Leu Asn Lys Asp Gly Lys Ile Gln Tyr  
 1 5 10 15  
  
 gtg tta tta aaa ggc gaa ccg ggc cac cct gat gcg gaa gca cgt acc 96  
 Val Leu Leu Lys Gly Glu Pro Gly His Pro Asp Ala Glu Ala Arg Thr  
 20 25 30  
  
 aag tat gtg att gag caa cta aac gcg caa ggc att cca acg gaa caa 144  
 Lys Tyr Val Ile Glu Gln Leu Asn Ala Gln Gly Ile Pro Thr Glu Gln  
 35 40 45  
  
 ctc ttt atc gac acc ggg atg tgg gat gcg gca ctg gca aaa gac aaa 192  
 Leu Phe Ile Asp Thr Gly Met Trp Asp Ala Ala Leu Ala Lys Asp Lys  
 50 55 60  
  
 atg gat gcg tgg tta tcc agc tct aaa gcc aat gac att gaa gtc att 240  
 Met Asp Ala Trp Leu Ser Ser Ser Lys Ala Asn Asp Ile Glu Val Ile  
 65 70 75 80  
  
 att tcc aac aac gac ggc atg gcg atg ggc gca ttg gaa gca acc aaa 288  
 Ile Ser Asn Asn Asp Gly Met Ala Met Gly Ala Leu Glu Ala Thr Lys  
 85 90 95  
  
 gca cac ggc aaa aaa tta ccg att ttc ggg gta gat gcg ttg cct gaa 336  
 Ala His Gly Lys Lys Leu Pro Ile Phe Gly Val Asp Ala Leu Pro Glu  
 100 105 110  
  
 gta tta caa ctc atc aag aaa ggc gac att gca ggt acc gta ttg aat 384  
 Val Leu Gln Leu Ile Lys Lys Gly Asp Ile Ala Gly Thr Val Leu Asn  
 115 120 125  
  
 gac ggc gcg act caa ggt aaa gcg att gtg gat tta tcc aac aac ctg 432  
 Asp Gly Ala Thr Gln Gly Lys Ala Ile Val Asp Leu Ser Asn Asn Leu  
 130 135 140  
  
 gca aac ggc aaa ccg gct acc gaa ggc acc aaa tgg gag ctt aaa gat 480  
 Ala Asn Gly Lys Pro Ala Thr Glu Gly Thr Lys Trp Glu Leu Lys Asp  
 145 150 155 160  
  
 cgc gtt gtg cgc att cct tat gtt ggc gta gat aaa gac aac ttg tct 528  
 Arg Val Val Arg Ile Pro Tyr Val Gly Val Asp Lys Asp Asn Leu Ser  
 165 170 175  
  
 caa ttc tta aaa 540  
 Gln Phe Leu Lys  
 180

<210> 176  
 <211> 180  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 176

Lys Ala Met Pro Ala Leu Asp Leu Asn Lys Asp Gly Lys Ile Gln Tyr  
 1 5 10 15

Val Leu Leu Lys Gly Glu Pro Gly His Pro Asp Ala Glu Ala Arg Thr  
 20 25 30

Lys Tyr Val Ile Glu Gln Leu Asn Ala Gln Gly Ile Pro Thr Glu Gln  
 35 40 45

Leu Phe Ile Asp Thr Gly Met Trp Asp Ala Ala Leu Ala Lys Asp Lys  
 50 55 60

Met Asp Ala Trp Leu Ser Ser Ser Lys Ala Asn Asp Ile Glu Val Ile  
 65 70 75 80

Ile Ser Asn Asn Asp Gly Met Ala Met Gly Ala Leu Glu Ala Thr Lys  
 85 90 95

Ala His Gly Lys Lys Leu Pro Ile Phe Gly Val Asp Ala Leu Pro Glu  
 100 105 110

Val Leu Gln Leu Ile Lys Lys Gly Asp Ile Ala Gly Thr Val Leu Asn  
 115 120 125

Asp Gly Ala Thr Gln Gly Lys Ala Ile Val Asp Leu Ser Asn Asn Leu  
 130 135 140

Ala Asn Gly Lys Pro Ala Thr Glu Gly Thr Lys Trp Glu Leu Lys Asp  
 145 150 155 160

Arg Val Val Arg Ile Pro Tyr Val Gly Val Asp Lys Asp Asn Leu Ser  
 165 170 175

Gln Phe Leu Lys  
 180

<210> 177  
 <211> 1071  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1)..(1071)

<400> 177

atg gca gga aat acc atc gga caa tta ttt cgc gtc acc acc ttc ggc	48
Met Ala Gly Asn Thr Ile Gly Gln Leu Phe Arg Val Thr Thr Phe Gly	
1 5 10 15	
gag tcc cac ggc att gcc ttg ggt tgc att gtg gac ggc gta ccg ccg	96
Glu Ser His Gly Ile Ala Leu Gly Cys Ile Val Asp Gly Val Pro Pro	
20 25 30	
aac atg gca tta tcg gaa gcg gat att caa ccg gat ttg gat cgt cgt	144
Asn Met Ala Leu Ser Glu Ala Asp Ile Gln Pro Asp Leu Asp Arg Arg	
35 40 45	
aaa ccc ggc acc tcg cgc tat acc aca ccg cgc cgc gaa gac gat gaa	192
Lys Pro Gly Thr Ser Arg Tyr Thr Thr Pro Arg Arg Glu Asp Asp Glu	
50 55 60	
gtg cag att tta tcc ggt gtc ttt gaa gga aaa acc acc ggc acc agt	240
Val Gln Ile Leu Ser Gly Val Phe Glu Gly Lys Thr Thr Gly Thr Ser	
65 70 75 80	
att ggc ata atc att aag aac ggc gat caa cgc tcg cag gac tat ggc	288
Ile Gly Ile Ile Ile Lys Asn Gly Asp Gln Arg Ser Gln Asp Tyr Gly	
85 90 95	
gaa att aaa gat cgc ttc cgt ccg gga cat gca gat ttt act tat caa	336
Glu Ile Lys Asp Arg Phe Arg Pro Gly His Ala Asp Phe Thr Tyr Gln	
100 105 110	
caa aaa tac ggc att cgt gat tat cgc ggc ggc ggt cgt tct tcc gcc	384
Gln Lys Tyr Gly Ile Arg Asp Tyr Arg Gly Gly Gly Arg Ser Ser Ala	
115 120 125	
cgc gaa act gcc atg cgc gtg gcg gcg ggt gcc atc gcg aaa aaa tat	432
Arg Glu Thr Ala Met Arg Val Ala Ala Gly Ala Ile Ala Lys Lys Tyr	
130 135 140	
tta cgc gaa caa ttc ggc att gaa gtg cgt ggt ttc tta agc caa atc	480
Leu Arg Glu Gln Phe Gly Ile Glu Val Arg Gly Phe Leu Ser Gln Ile	
145 150 155 160	
ggc gat gtc aaa att gcg ccg caa tcc gtg gaa cat att gat tgg gca	528
Gly Asp Val Lys Ile Ala Pro Gln Ser Val Glu His Ile Asp Trp Ala	
165 170 175	
gaa gta aat agc aat ctg ttt ttc tgc ccc gat aaa agt gcg gtg gaa	576
Glu Val Asn Ser Asn Leu Phe Phe Cys Pro Asp Lys Ser Ala Val Glu	
180 185 190	
aaa ttc gat gaa tta att cgt gat ctg aaa aaa caa ggg gat tct atc	624
Lys Phe Asp Glu Leu Ile Arg Asp Leu Lys Lys Gln Gly Asp Ser Ile	
195 200 205	
ggg gct aaa ttg acc gtg gtg gcg gaa aac gtc ccc gtc ggg ttg ggc	672
Gly Ala Lys Leu Thr Val Val Ala Glu Asn Val Pro Val Gly Leu Gly	
210 215 220	

gaa ccg gtg ttt gat cgt ttg gat gcg gat tta gcc cac gca tta atg	720
Glu Pro Val Phe Asp Arg Leu Asp Ala Asp Leu Ala His Ala Leu Met	
225 230 235 240	
agc att aat gcg gta aaa ggc gtg gaa att ggt gac ggt ttc gct gtg	768
Ser Ile Asn Ala Val Lys Gly Val Glu Ile Gly Asp Gly Phe Ala Val	
245 250 255	
gta gaa caa aaa ggt agc caa cat cgt gac gaa atg atc ccg caa gga	816
Val Glu Gln Lys Gly Ser Gln His Arg Asp Glu Met Ile Pro Gln Gly	
260 265 270	
ttt ctt tcc aac tat gcc ggc ggg att ttg ggc ggc atc agt tca gga	864
Phe Leu Ser Asn Tyr Ala Gly Gly Ile Leu Gly Gly Ile Ser Ser Gly	
275 280 285	
caa ccg att atc gcc acg att gcc ctc aaa ccc act tcc agc att acc	912
Gln Pro Ile Ile Ala Thr Ile Ala Leu Lys Pro Thr Ser Ser Ile Thr	
290 295 300	
att ccg ggg cgc tcg gtg aat ctc gac aat gaa tct gtc gaa gtt gtt	960
Ile Pro Gly Arg Ser Val Asn Leu Asp Asn Glu Ser Val Glu Val Val	
305 310 315 320	
act aaa ggt cgc cac gat cct tgt gtc ggc atc cgc gcc gtg ccg att	1008
Thr Lys Gly Arg His Asp Pro Cys Val Gly Ile Arg Ala Val Pro Ile	
325 330 335	
gcg gaa gct atg acg gcg att gta ttg ttg gat cat ttg ttg cgt ttt	1056
Ala Glu Ala Met Thr Ala Ile Val Leu Leu Asp His Leu Leu Arg Phe	
340 345 350	
aaa gcg caa tgc cga	1071
Lys Ala Gln Cys Arg	
355	

<210> 178  
 <211> 357  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 178

Met Ala Gly Asn Thr Ile Gly Gln Leu Phe Arg Val Thr Thr Phe Gly	
1 5 10 15	
Glu Ser His Gly Ile Ala Leu Gly Cys Ile Val Asp Gly Val Pro Pro	
20 25 30	
Asn Met Ala Leu Ser Glu Ala Asp Ile Gln Pro Asp Leu Asp Arg Arg	
35 40 45	



Lys Pro Gly Thr Ser Arg Tyr Thr Thr Pro Arg Arg Glu Asp Asp Glu  
50 55 60

Val Gln Ile Leu Ser Gly Val Phe Glu Gly Lys Thr Thr Gly Thr Ser  
65 70 75 80

Ile Gly Ile Ile Ile Lys Asn Gly Asp Gln Arg Ser Gln Asp Tyr Gly  
85 90 95

Glu Ile Lys Asp Arg Phe Arg Pro Gly His Ala Asp Phe Thr Tyr Gln  
100 105 110

Gln Lys Tyr Gly Ile Arg Asp Tyr Arg Gly Gly Gly Arg Ser Ser Ala  
115 120 125

Arg Glu Thr Ala Met Arg Val Ala Ala Gly Ala Ile Ala Lys Lys Tyr  
130 135 140

Leu Arg Glu Gln Phe Gly Ile Glu Val Arg Gly Phe Leu Ser Gln Ile  
145 150 155 160

Gly Asp Val Lys Ile Ala Pro Gln Ser Val Glu His Ile Asp Trp Ala  
165 170 175

Glu Val Asn Ser Asn Leu Phe Phe Cys Pro Asp Lys Ser Ala Val Glu  
180 185 190

Lys Phe Asp Glu Leu Ile Arg Asp Leu Lys Lys Gln Gly Asp Ser Ile  
195 200 205

Gly Ala Lys Leu Thr Val Val Ala Glu Asn Val Pro Val Gly Leu Gly  
210 215 220

Glu Pro Val Phe Asp Arg Leu Asp Ala Asp Leu Ala His Ala Leu Met  
225 230 235 240

Ser Ile Asn Ala Val Lys Gly Val Glu Ile Gly Asp Gly Phe Ala Val  
245 250 255

Val Glu Gln Lys Gly Ser Gln His Arg Asp Glu Met Ile Pro Gln Gly  
260 265 270

Phe Leu Ser Asn Tyr Ala Gly Gly Ile Leu Gly Gly Ile Ser Ser Gly

275

280

285

Gln Pro Ile Ile Ala Thr Ile Ala Leu Lys Pro Thr Ser Ser Ile Thr  
290 295 300

Ile Pro Gly Arg Ser Val Asn Leu Asp Asn Glu Ser Val Glu Val Val  
305 310 315 320

Thr Lys Gly Arg His Asp Pro Cys Val Gly Ile Arg Ala Val Pro Ile  
325 330 335

Ala Glu Ala Met Thr Ala Ile Val Leu Leu Asp His Leu Leu Arg Phe  
340 345 350

Lys Ala Gln Cys Arg  
355

<210> 179

<211> 633

<212> DNA

<213> Actinobacillus actinomycetemcomitans

<220>

<221> CDS

<222> (1) .. (633)

<400> 179

gac ctc ttg gtg gat tcc tac gtg aaa tgg cgt atc aat gat tta ggt 48  
Asp Leu Leu Val Asp Ser Tyr Val Lys Trp Arg Ile Asn Asp Leu Gly  
1 5 10 15

cgt ttc ttc acc acg acc ggt ggt ggc gat tat gca caa gca gcc aac 96  
Arg Phe Phe Thr Thr Thr Gly Gly Gly Asp Tyr Ala Gln Ala Ala Asn  
20 25 30

tta tta cgt cgt aaa gtc aat gac cgt ttg cgt tcc gaa atc ggt tcc 144  
Leu Leu Arg Arg Lys Val Asn Asp Arg Leu Arg Ser Glu Ile Gly Ser  
35 40 45

cgc acc att aaa gac atc gtt tcc ggt aca cga ggc gaa ctc atg gta 192  
Arg Thr Ile Lys Asp Ile Val Ser Gly Thr Arg Gly Glu Leu Met Val  
50 55 60

ggc acg aaa aaa gcg ctc aac agt ggg caa gac agc acc gcc gaa ctg 240  
Gly Thr Lys Lys Ala Leu Asn Ser Gly Gln Asp Ser Thr Ala Glu Leu  
65 70 75 80

ggg att gaa gtg ctc gac gta cgg att aaa caa att aac ttg ccg gat 288  
Gly Ile Glu Val Leu Asp Val Arg Ile Lys Gln Ile Asn Leu Pro Asp  
85 90 95

gaa	gtg	tct	tcc	tcc	att	tac	cag	cgt	atg	cgc	gcc	gaa	cgg	gat	gcg	336
Glu	Val	Ser	Ser	Ser	Ile	Tyr	Gln	Arg	Met	Arg	Ala	Glu	Arg	Asp	Ala	
			100					105					110			

gta	gcc	cgt	gaa	cac	cgc	tct	caa	ggg	aaa	gaa	aaa	gcg	gca	ttt	att	384
Val	Ala	Arg	Glu	His	Arg	Ser	Gln	Gly	Lys	Glu	Lys	Ala	Ala	Phe	Ile	
			115				120					125				

cag	gcg	gat	gta	gat	cgt	aaa	gtc	acc	tta	att	atc	gcc	aat	gcg	gaa	432
Gln	Ala	Asp	Val	Asp	Arg	Lys	Val	Thr	Leu	Ile	Ile	Ala	Asn	Ala	Glu	
			130			135					140					

aaa	acc	gca	cag	gaa	tta	cgc	ggg	gac	ggc	gac	gcg	acc	gca	gcc	aaa	480
Lys	Thr	Ala	Gln	Glu	Leu	Arg	Gly	Asp	Gly	Asp	Ala	Thr	Ala	Ala	Lys	
					150				155						160	

atc	ttt	gcc	gat	gcc	ttt	ggg	aaa	gag	cct	gaa	ttt	tac	agc	ttc	att	528
Ile	Phe	Ala	Asp	Ala	Phe	Gly	Lys	Glu	Pro	Glu	Phe	Tyr	Ser	Phe	Ile	
				165				170						175		

cgt	agc	ctg	aaa	gcc	tat	gaa	agc	agc	ttc	gcc	gac	tcg	gac	aat	ttg	576
Arg	Ser	Leu	Lys	Ala	Tyr	Glu	Ser	Ser	Phe	Ala	Asp	Ser	Asp	Asn	Leu	
			180					185					190			

ttg	att	tta	aaa	ccg	gac	agt	gac	ttc	ttc	cgt	ttt	atg	caa	tca	cca	624
Leu	Ile	Leu	Lys	Pro	Asp	Ser	Asp	Phe	Phe	Arg	Phe	Met	Gln	Ser	Pro	
			195				200					205				

agt	aaa	taa														633
Ser	Lys															
		210														

<210> 180  
 <211> 210  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans  
  
 <400> 180

Asp	Leu	Leu	Val	Asp	Ser	Tyr	Val	Lys	Trp	Arg	Ile	Asn	Asp	Leu	Gly
1				5					10					15	

Arg	Phe	Phe	Thr	Thr	Thr	Gly	Gly	Gly	Asp	Tyr	Ala	Gln	Ala	Ala	Asn
			20				25						30		

Leu	Leu	Arg	Arg	Lys	Val	Asn	Asp	Arg	Leu	Arg	Ser	Glu	Ile	Gly	Ser
		35					40					45			

Arg	Thr	Ile	Lys	Asp	Ile	Val	Ser	Gly	Thr	Arg	Gly	Glu	Leu	Met	Val
	50					55					60				

Gly	Thr	Lys	Lys	Ala	Leu	Asn	Ser	Gly	Gln	Asp	Ser	Thr	Ala	Glu	Leu
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----



gca tta agc cat tcc att cgc aag ctg gaa gaa cag ctc aac atc aaa	144
Ala Leu Ser His Ser Ile Arg Lys Leu Glu Glu Gln Leu Asn Ile Lys	
35 40 45	
ctg ttc aac cgc acc aca cgc agc att gcc acc acg gag gcg ggc gag	192
Leu Phe Asn Arg Thr Thr Arg Ser Ile Ala Thr Thr Glu Ala Gly Glu	
50 55 60	
cag ttg ttt caa aat ctc ttg ccg ttg ttt gaa agt att gaa gat aat	240
Gln Leu Phe Gln Asn Leu Leu Pro Leu Phe Glu Ser Ile Glu Asp Asn	
65 70 75 80	
ctc aac gca tta agc acc ttt cgc aac acg ttg aaa ggg aaa tta tgc	288
Leu Asn Ala Leu Ser Thr Phe Arg Asn Thr Leu Lys Gly Lys Leu Cys	
85 90 95	
att aac ggt aac gat cat gtt ttt tta tcc att ttg tgg gat aaa ttg	336
Ile Asn Gly Asn Asp His Val Phe Leu Ser Ile Leu Trp Asp Lys Leu	
100 105 110	
atg gcg ttc gcg gaa caa tac ccc gaa atg gaa ttg gaa ttg acc agt	384
Met Ala Phe Ala Glu Gln Tyr Pro Glu Met Glu Leu Glu Leu Thr Ser	
115 120 125	
gac acc aaa ttt gtg gat atc gtg gcg ggg cgg ttt gat gcg ggt att	432
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165 170 175	
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Ala Leu Ser His Ser Ile Arg Lys Leu Glu Glu Gln Leu Asn Ile Lys  
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Leu Phe Asn Arg Thr Thr Arg Ser Ile Ala Thr Thr Glu Ala Gly Glu  
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Gln Leu Phe Gln Asn Leu Leu Pro Leu Phe Glu Ser Ile Glu Asp Asn  
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Leu Asn Ala Leu Ser Thr Phe Arg Asn Thr Leu Lys Gly Lys Leu Cys  
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Ile Asn Gly Asn Asp His Val Phe Leu Ser Ile Leu Trp Asp Lys Leu  
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Met Ala Phe Ala Glu Gln Tyr Pro Glu Met Glu Leu Glu Leu Thr Ser  
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Asp Thr Lys Phe Val Asp Ile Val Ala Gly Arg Phe Asp Ala Gly Ile  
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Arg Leu Gly Ser Asp Val Ala Gln Asp Met Ile Ala Val Arg Leu Ser  
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Phe Trp Met Arg Phe Leu Arg Met Gly Val Val Ser Ile Leu Leu Gly	
35 40 45	
ggg att ttt atc gtc ggc ggt ttg tat cgt tcc gaa tgg cgt gat gat	192
Gly Ile Phe Ile Val Gly Gly Leu Tyr Arg Ser Glu Trp Arg Asp Asp	
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att cgt caa tgg gtt tct atg ccg cag gtg atg tta gac gag gcg aag	240
Ile Arg Gln Trp Val Ser Met Pro Gln Val Met Leu Asp Glu Ala Lys	
65 70 75	
caa atc gct gac ttg acc ggc gtg gat ttg ggc aac cgt tat ttc ctg	288
Gln Ile Ala Asp Leu Thr Gly Val Asp Leu Gly Asn Arg Tyr Phe Leu	
80 85 90 95	
gtg ctt gcc gac aac gac gat gcc tta ctg gaa aaa gaa cgg gcg ctg	336
Val Leu Ala Asp Asn Asp Asp Ala Leu Leu Glu Lys Glu Arg Ala Leu	
100 105 110	
aca aca aaa ctg gat gaa cag cac atc cct tat cgc gcc ctt tcc caa	384
Thr Thr Lys Leu Asp Glu Gln His Ile Pro Tyr Arg Ala Leu Ser Gln	
115 120 125	
tgg atg atg tcg gaa gcg caa cag cgg caa ttt ata gtg gaa ttg cag	432
Trp Met Met Ser Glu Ala Gln Gln Arg Gln Phe Ile Val Glu Leu Gln	
130 135 140	
gca aaa ctc aaa ccg cag gat tat gcc gta ttg gat gag att ggc gtg	480
Ala Lys Leu Lys Pro Gln Asp Tyr Ala Val Leu Asp Glu Ile Gly Val	
145 150 155	
ccg tcg gaa aga tta caa cag gca ctg cgg gaa ttg aac acg cag ccg	528
Pro Ser Glu Arg Leu Gln Gln Ala Leu Arg Glu Leu Asn Thr Gln Pro	
160 165 170 175	
ccg tta tcc ttg cag cag gcg ttg caa tct acc gtc ggg caa gca tgg	576
Pro Leu Ser Leu Gln Gln Ala Leu Gln Ser Thr Val Gly Gln Ala Trp	
180 185 190	
ctg ccg ctc tat tta ggc aaa tta gcg gaa aat cag gtg gct ggc atc	624
Leu Pro Leu Tyr Leu Gly Lys Leu Ala Glu Asn Gln Val Ala Gly Ile	
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Ile Phe Ile Val Gly Gly Leu Tyr Arg Ser Glu Trp Arg Asp Asp Ile  
 50 55 60

Arg Gln Trp Val Ser Met Pro Gln Val Met Leu Asp Glu Ala Lys Gln  
 65 70 75 80

Ile Ala Asp Leu Thr Gly Val Asp Leu Gly Asn Arg Tyr Phe Leu Val  
 85 90 95

Leu Ala Asp Asn Asp Asp Ala Leu Leu Glu Lys Glu Arg Ala Leu Thr  
 100 105 110

Thr Lys Leu Asp Glu Gln His Ile Pro Tyr Arg Ala Leu Ser Gln Trp  
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Met Met Ser Glu Ala Gln Gln Arg Gln Phe Ile Val Glu Leu Gln Ala  
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Lys Leu Lys Pro Gln Asp Tyr Ala Val Leu Asp Glu Ile Gly Val Pro  
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Ser Glu Arg Leu Gln Gln Ala Leu Arg Glu Leu Asn Thr Gln Pro Pro  
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Leu Ser Leu Gln Gln Ala Leu Gln Ser Thr Val Gly Gln Ala Trp Leu  
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Pro Leu Tyr Leu Gly Lys Leu Ala Glu Asn Gln Val Ala Gly Ile Val  
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 gca cct aaa gtg gcg gaa ttg gcg tta tat cgt gag cgg ctg ccg gaa 96  
 Ala Pro Lys Val Ala Glu Leu Ala Leu Tyr Arg Glu Arg Leu Pro Glu  
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 aaa tta agc tat ctg gct gac gca cca caa acg gat ccg gaa ggc agt 144  
 Lys Leu Ser Tyr Leu Ala Asp Ala Pro Gln Thr Asp Pro Glu Gly Ser  
 35 40 45  
 gaa gcc atc att cgc ttt agt cgt aaa gaa aaa cgt caa tat gtc acc 192  
 Glu Ala Ile Ile Arg Phe Ser Arg Lys Glu Lys Arg Gln Tyr Val Thr  
 50 55 60  
 tcc gaa aag aat ggc aag gcg aca aaa tgg ata gtg gat ttt gtt gat 240  
 Ser Glu Lys Asn Gly Lys Ala Thr Lys Trp Ile Val Asp Phe Val Asp  
 65 70 75 80  
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 20 25 30  
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Glu Ala Ile Ile Arg Phe Ser Arg Lys Glu Lys Arg Gln Tyr Val Thr  
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Ser Glu Lys Asn Gly Lys Ala Thr Lys Trp Ile Val Asp Phe Val Asp  
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cct acg ccc acg gca gat agg gac cga act gtc tca cga cgt tct aaa 96  
 Pro Thr Pro Thr Ala Asp Arg Asp Arg Thr Val Ser Arg Arg Ser Lys  
 20 25 30

ccc agc tcg cgt acc act tta aat ggc gaa cag cca tac cct tgg gac 144  
 Pro Ser Ser Arg Thr Thr Leu Asn Gly Glu Gln Pro Tyr Pro Trp Asp  
 35 40 45

cta ctt cag ccc cag gat gtg atg agc cga cat cga ggt gcc aaa cac 192  
 Leu Leu Gln Pro Gln Asp Val Met Ser Arg His Arg Gly Ala Lys His  
 50 55 60

cgc cgt cga tat gaa ctc ttg ggc ggt atc agc ctg tta tcc ccg gag 240  
 Arg Arg Arg Tyr Glu Leu Leu Gly Gly Ile Ser Leu Leu Ser Pro Glu  
 65 70 75 80

tac ctt tta tcc gtt gag cga tgg ccc ttc cat gca gaa cca ccg gat 288  
 Tyr Leu Leu Ser Val Glu Arg Trp Pro Phe His Ala Glu Pro Pro Asp  
 85 90 95

cac tat gac cta ctt tcg tac ctg ccc gac ctg tcc gtc tcg cag tta 336  
 His Tyr Asp Leu Leu Ser Tyr Leu Pro Asp Leu Ser Val Ser Gln Leu  
 100 105 110

agc ttg ctt ata cca ttg cac 357  
 Ser Leu Leu Ile Pro Leu His  
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Cys Val His Ser Gly Pro Leu Val Leu Gly Ala Ala Pro Thr Asn Ser  
 1 5 10 15

Pro Thr Pro Thr Ala Asp Arg Asp Arg Thr Val Ser Arg Arg Ser Lys  
 20 25 30

Pro Ser Ser Arg Thr Thr Leu Asn Gly Glu Gln Pro Tyr Pro Trp Asp  
 35 40 45

Leu Leu Gln Pro Gln Asp Val Met Ser Arg His Arg Gly Ala Lys His  
 50 55 60

Arg Arg Arg Tyr Glu Leu Leu Gly Gly Ile Ser Leu Leu Ser Pro Glu  
 65 70 75 80

Tyr Leu Leu Ser Val Glu Arg Trp Pro Phe His Ala Glu Pro Pro Asp  
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His Tyr Asp Leu Leu Ser Tyr Leu Pro Asp Leu Ser Val Ser Gln Leu  
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Ser Leu Leu Ile Pro Leu His  
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gaa acc gtg tgc tat gaa atc atg cgc gaa atc att cgc gta cac cat 48  
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gta ttt gcc agc gaa caa ttc gtg gtt tat gcc tct cac gcc gtc gcc 96  
 Val Phe Ala Ser Glu Gln Phe Val Val Tyr Ala Ser His Ala Val Ala  
 20 25 30

gat tat ctg att aac gaa gaa tcc cac ggc tta ctg gct gaa ctg gaa 144  
 Asp Tyr Leu Ile Asn Glu Glu Ser His Gly Leu Leu Ala Glu Leu Glu  
 35 40 45

gtg ttc atc ggc aaa caa atc caa gta aaa act gaa gtg ttt tat act 192  
 Val Phe Ile Gly Lys Gln Ile Gln Val Lys Thr Glu Val Phe Tyr Thr  
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Asp Tyr Leu Ile Asn Glu Glu Ser His Gly Leu Leu Ala Glu Leu Glu  
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gac atc aaa tac agt ccg ggc ggg ttg cgc gat ttg cat ttg ttg tat 96  
 Asp Ile Lys Tyr Ser Pro Gly Gly Leu Arg Asp Leu His Leu Leu Tyr

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cag	gcg	ggg	ttt	att	cat	ccg	gca	gaa	cac	gcc	ttg	tta	cta	aaa	agc	192		
Gln	Ala	Gly	Phe	Ile	His	Pro	Ala	Glu	His	Ala	Leu	Leu	Leu	Lys	Ser			
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Gln	Gln	Phe	Leu	Phe	Lys	Val	Arg	Tyr	Ala	Leu	His	Leu	Ile	Leu	Lys			
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cgt	tat	gac	aac	cgc	ctg	ttg	ttt	gat	cgc	caa	ctg	aaa	gtc	agc	gaa	288		
Arg	Tyr	Asp	Asn	Arg	Leu	Leu	Phe	Asp	Arg	Gln	Leu	Lys	Val	Ser	Glu			
				85				90						95				
ttg	ttg	ggt	ttc	cag	ggg	gaa	ggc	aat	caa	ggc	gtg	gaa	gcc	atg	atg	336		
Leu	Leu	Gly	Phe	Gln	Gly	Glu	Gly	Asn	Gln	Gly	Val	Glu	Ala	Met	Met			
		100						105				110						
aag	cgc	ttt	ttt	cag	gcg	ttg	cat	tcc	att	tcg	tta	cta	agc	gaa	ttg	384		
Lys	Arg	Phe	Phe	Gln	Ala	Leu	His	Ser	Ile	Ser	Leu	Leu	Ser	Glu	Leu			
		115						120				125						
ttg	gta	aaa	cat	tat	cag	gaa	cat	ttt	tta	acc	cgt	cat	gca	gtg	gtg	432		
Leu	Val	Lys	His	Tyr	Gln	Glu	His	Phe	Leu	Thr	Arg	His	Ala	Val	Val			
		130				135				140								
agc	gag	caa	ata	ctc	gat	gac	aat	ttc	agc	ctg	atc	aat	caa	tcc	att	480		
Ser	Glu	Gln	Ile	Leu	Asp	Asp	Asn	Phe	Ser	Leu	Ile	Asn	Gln	Ser	Ile			
145					150				155						160			
tgc	tta	cgt	aat	cat	caa	tgc	ttt	gag	cag	cag	ccg	gaa	agc	att	ctt	528		
Cys	Leu	Arg	Asn	His	Gln	Cys	Phe	Glu	Gln	Gln	Pro	Glu	Ser	Ile	Leu			
				165				170				175						
gac	ctt	ttt	tat	cat	tta	acc	caa	tat	ccg	cag	gcg	gaa	att	cat	tcc	576		
Asp	Leu	Phe	Tyr	His	Leu	Thr	Gln	Tyr	Pro	Gln	Ala	Glu	Ile	His	Ser			
		180						185				190						
ttt	gtc	ttg	cgc	gag	ctt	tat	ttg	gcg	ctg	gag	caa	cgg	cag	ggc	tat	624		
Phe	Val	Leu	Arg	Glu	Leu	Tyr	Leu	Ala	Leu	Glu	Gln	Arg	Gln	Gly	Tyr			
		195				200				205								
ttg	tgt	gat	ttg	cca	gcg	gcg	cgg	gaa	aaa	ttc	gtg	cgc	ctg	ttt	aat	672		
Leu	Cys	Asp	Leu	Pro	Ala	Ala	Arg	Glu	Lys	Phe	Val	Arg	Leu	Phe	Asn			
		210				215				220								
cag	ccg	aat	gcg	att	aaa	cgt	gct	ttt	ttc	cct	atg	cac	caa	tac	ggc	720		
Gln	Pro	Asn	Ala	Ile	Lys	Arg	Ala	Phe	Phe	Pro	Met	His	Gln	Tyr	Gly			
225					230				235						240			
gtg	ctt	acc	gcc	tat	tta	ccg	caa	tgg	ggc	aac	gtc	gtc	ggg	tta	atg	768		
Val	Leu	Thr	Ala	Tyr	Leu	Pro	Gln	Trp	Gly	Asn	Val	Val	Gly	Leu	Met			
				245				250				255						

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Gln Phe Asp Leu Phe His Cys Tyr Thr Val Asp Glu His Ile Leu Arg	
260 265 270	
gtg atg tta aaa ctg gaa agt ttt tta gag ggc gct tcg gca caa agc	864
Val Met Leu Lys Leu Glu Ser Phe Leu Glu Gly Ala Ser Ala Gln Ser	
275 280 285	
cat ccc att tgc cat caa ata ttc agc cga att tcc gac cgc act ttg	912
His Pro Ile Cys His Gln Ile Phe Ser Arg Ile Ser Asp Arg Thr Leu	
290 295 300	
ttg tat att gcc gct tta ttt cac gac atc gcc aaa ggg cgc ggc ggt	960
Leu Tyr Ile Ala Ala Leu Phe His Asp Ile Ala Lys Gly Arg Gly Gly	
305 310 315 320	
tct cat gaa tta ttg ggt gcg gtg gat gtg cgc gaa ttt gcc gtt cgg	1008
Ser His Glu Leu Leu Gly Ala Val Asp Val Arg Glu Phe Ala Val Arg	
325 330 335	
cac ggt ttt gat caa cgg gaa acg gaa acc atg gtg tgg ctg gtg gag	1056
His Gly Phe Asp Gln Arg Glu Thr Glu Thr Met Val Trp Leu Val Glu	
340 345 350	
cag cat ttg ctt atg tcg gtc acg gca caa cgg cgg gat att cat gat	1104
Gln His Leu Leu Met Ser Val Thr Ala Gln Arg Arg Asp Ile His Asp	
355 360 365	
ccg gaa att gta ctg aat ttc gcc gaa ctg gtg cgt aat cag gtg cgt	1152
Pro Glu Ile Val Leu Asn Phe Ala Glu Leu Val Arg Asn Gln Val Arg	
370 375 380	
ttg gat tat tta acc tgc ctg acc gtc gcc gat att gtg gcg acc aat	1200
Leu Asp Tyr Leu Thr Cys Leu Thr Val Ala Asp Ile Val Ala Thr Asn	
385 390 395 400	
gaa act ttg tgg aat agc tgg aag cgt tct ttg ctg gcg act ttg tac	1248
Glu Thr Leu Trp Asn Ser Trp Lys Arg Ser Leu Leu Ala Thr Leu Tyr	
405 410 415	
gat tac gcc acc caa caa ttc gcc caa ggg ctg gaa agt atc ttg gat	1296
Asp Tyr Ala Thr Gln Gln Phe Ala Gln Gly Leu Glu Ser Ile Leu Asp	
420 425 430	
aat caa gcg aaa gcg aaa gga cac cgc cga tta gca ctg cag gaa ata	1344
Asn Gln Ala Lys Ala Lys Gly His Arg Arg Leu Ala Leu Gln Glu Ile	
435 440 445	
cgt gaa aaa acc acc gca ctt tcc gac aaa cac atc gaa aaa ttg tgg	1392
Arg Glu Lys Thr Thr Ala Leu Ser Asp Lys His Ile Glu Lys Leu Trp	
450 455 460	
cag cgt ttt ccg ata gat tat ttc ttg cgc aat tcg cca caa caa att	1440
Gln Arg Phe Pro Ile Asp Tyr Phe Leu Arg Asn Ser Pro Gln Gln Ile	
465 470 475 480	

ggt tgg cat acc cgt ttg ctt gcc gaa ttt gaa ggg gaa ttg ttg gtg	1488
Gly Trp His Thr Arg Leu Leu Ala Glu Phe Glu Gly Glu Leu Leu Val	
485 490 495	

aaa gtc agt aac cgg ttt tct gcc ggc ggc acg gaa att ttc att tat	1536
Lys Val Ser Asn Arg Phe Ser Ala Gly Gly Thr Glu Ile Phe Ile Tyr	
500 505 510	

acc aaa gac cga ccg aac ctg ttt cac aaa gtg gta agt act atc ggc	1584
Thr Lys Asp Arg Pro Asn Leu Phe His Lys Val Val Ser Thr Ile Gly	
515 520 525	

gcg aaa aaa ctc agt atc cat gat gcg caa att atc acc gcc aaa gac	1632
Ala Lys Lys Leu Ser Ile His Asp Ala Gln Ile Ile Thr Ala Lys Asp	
530 535 540	

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Gly Tyr Val Leu Asp Ser Phe Ile Val Thr Glu Leu	
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<400> 192

Ile Glu Arg Tyr Gln Arg Tyr Asn Asn Thr Ser Tyr Asn Leu Glu Pro
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Asp Ile Lys Tyr Ser Pro Gly Gly Leu Arg Asp Leu His Leu Leu Tyr
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Trp Ile Ala Leu Arg His Asn Gly Ala Lys Asn Leu Gln Glu Ile Leu
35 40 45

Gln Ala Gly Phe Ile His Pro Ala Glu His Ala Leu Leu Leu Lys Ser
50 55 60

Gln Gln Phe Leu Phe Lys Val Arg Tyr Ala Leu His Leu Ile Leu Lys
65 70 75 80

Arg Tyr Asp Asn Arg Leu Leu Phe Asp Arg Gln Leu Lys Val Ser Glu
85 90 95

Leu Leu Gly Phe Gln Gly Glu Gly Asn Gln Gly Val Glu Ala Met Met
100 105 110

Lys Arg Phe Phe Gln Ala Leu His Ser Ile Ser Leu Leu Ser Glu Leu

115	120	125
Leu Val Lys His Tyr Gln Glu His Phe Leu Thr Arg His Ala Val Val		
130	135	140
Ser Glu Gln Ile Leu Asp Asp Asn Phe Ser Leu Ile Asn Gln Ser Ile		
145	150	155
Cys Leu Arg Asn His Gln Cys Phe Glu Gln Gln Pro Glu Ser Ile Leu		
165	170	175
Asp Leu Phe Tyr His Leu Thr Gln Tyr Pro Gln Ala Glu Ile His Ser		
180	185	190
Phe Val Leu Arg Glu Leu Tyr Leu Ala Leu Glu Gln Arg Gln Gly Tyr		
195	200	205
Leu Cys Asp Leu Pro Ala Ala Arg Glu Lys Phe Val Arg Leu Phe Asn		
210	215	220
Gln Pro Asn Ala Ile Lys Arg Ala Phe Phe Pro Met His Gln Tyr Gly		
225	230	235
Val Leu Thr Ala Tyr Leu Pro Gln Trp Gly Asn Val Val Gly Leu Met		
245	250	255
Gln Phe Asp Leu Phe His Cys Tyr Thr Val Asp Glu His Ile Leu Arg		
260	265	270
Val Met Leu Lys Leu Glu Ser Phe Leu Glu Gly Ala Ser Ala Gln Ser		
275	280	285
His Pro Ile Cys His Gln Ile Phe Ser Arg Ile Ser Asp Arg Thr Leu		
290	295	300
Leu Tyr Ile Ala Ala Leu Phe His Asp Ile Ala Lys Gly Arg Gly Gly		
305	310	315
Ser His Glu Leu Leu Gly Ala Val Asp Val Arg Glu Phe Ala Val Arg		
325	330	335
His Gly Phe Asp Gln Arg Glu Thr Glu Thr Met Val Trp Leu Val Glu		
340	345	350



Gln His Leu Leu Met Ser Val Thr Ala Gln Arg Arg Asp Ile His Asp  
 355 360 365

Pro Glu Ile Val Leu Asn Phe Ala Glu Leu Val Arg Asn Gln Val Arg  
 370 375 380

Leu Asp Tyr Leu Thr Cys Leu Thr Val Ala Asp Ile Val Ala Thr Asn  
 385 390 395 400

Glu Thr Leu Trp Asn Ser Trp Lys Arg Ser Leu Leu Ala Thr Leu Tyr  
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Asp Tyr Ala Thr Gln Gln Phe Ala Gln Gly Leu Glu Ser Ile Leu Asp  
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Asn Gln Ala Lys Ala Lys Gly His Arg Arg Leu Ala Leu Gln Glu Ile  
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Arg Glu Lys Thr Thr Ala Leu Ser Asp Lys His Ile Glu Lys Leu Trp  
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Gln Arg Phe Pro Ile Asp Tyr Phe Leu Arg Asn Ser Pro Gln Gln Ile  
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Gly Trp His Thr Arg Leu Leu Ala Glu Phe Glu Gly Glu Leu Leu Val  
 485 490 495

Lys Val Ser Asn Arg Phe Ser Ala Gly Gly Thr Glu Ile Phe Ile Tyr  
 500 505 510

Thr Lys Asp Arg Pro Asn Leu Phe His Lys Val Val Ser Thr Ile Gly  
 515 520 525

Ala Lys Lys Leu Ser Ile His Asp Ala Gln Ile Ile Thr Ala Lys Asp  
 530 535 540

Gly Tyr Val Leu Asp Ser Phe Ile Val Thr Glu Leu  
 545 550 555

<210> 193

<211> 567

<212> DNA

<213> Actinobacillus actinomycetemcomitans

<220>

<221> CDS

<222> (1)..(567)

<400> 193

gtc aac cat tcg ctt tat tcc gta ttg aga ccg att aat ggc gaa agc	48
Val Asn His Ser Leu Tyr Ser Val Leu Arg Pro Ile Asn Gly Glu Ser	
1 5 10 15	

acc ctt att aaa ggt caa gcg aag tgg gtg att tca aga ggt tcg cgt	96
Thr Leu Ile Lys Gly Gln Ala Lys Trp Val Ile Ser Arg Gly Ser Arg	
20 25 30	

aat cgc act ttt cgt gtc ggt caa tct tat tgt cct tgt tgt tta ggg	144
Asn Arg Thr Phe Arg Val Gly Gln Ser Tyr Cys Pro Cys Cys Leu Gly	
35 40 45	

gaa aca cct tat ttg cgt aat gaa tgg cgt ttt gcg tgg cat ttt ggt	192
Glu Thr Pro Tyr Leu Arg Asn Glu Trp Arg Phe Ala Trp His Phe Gly	
50 55 60	

tgt tcg aaa cat caa gtt tta ctt gaa tct aaa tgc cct tgt tgt ggc	240
Cys Ser Lys His Gln Val Leu Leu Glu Ser Lys Cys Pro Cys Cys Gly	
65 70 75 80	

gaa ctg tat caa cct cat ttg ctt tcc gca gaa aaa cga cac tta aat	288
Glu Leu Tyr Gln Pro His Leu Leu Ser Ala Glu Lys Arg His Leu Asn	
85 90 95	

tac tgt cat caa tgt ggt gag aaa tta cag gtt gtt aca aca ccg ctt	336
Tyr Cys His Gln Cys Gly Glu Lys Leu Gln Val Val Thr Thr Pro Leu	
100 105 110	

aat gaa gta gaa att gca aca atg gaa aca ctt aat aac gta ttt atg	384
Asn Glu Val Glu Ile Ala Thr Met Glu Thr Leu Asn Asn Val Phe Met	
115 120 125	

act aac tca ggt gaa tgt ttc agg aaa cgt gtg aat gca caa gtg tac	432
Thr Asn Ser Gly Glu Cys Phe Arg Lys Arg Val Asn Ala Gln Val Tyr	
130 135 140	

ttt gct ata ttg cgt tac ttc atc aat ctt att cgg cgt gct acg gtc	480
Phe Ala Ile Leu Arg Tyr Phe Ile Asn Leu Ile Arg Arg Ala Thr Val	
145 150 155 160	

gta aaa tct act cac gct ttt gca aaa ttt gtg gaa gaa tgt ggt att	528
Val Lys Ser Thr His Ala Phe Ala Lys Phe Val Glu Glu Cys Gly Ile	
165 170 175	

tct caa gcg gaa ata tgc caa acc aaa acc gcc ctt gca	567
Ser Gln Ala Glu Ile Cys Gln Thr Lys Thr Ala Leu Ala	
180 185	

<210> 194

<211> 189  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 194

Val Asn His Ser Leu Tyr Ser Val Leu Arg Pro Ile Asn Gly Glu Ser  
 1 5 10 15

Thr Leu Ile Lys Gly Gln Ala Lys Trp Val Ile Ser Arg Gly Ser Arg  
 20 25 30

Asn Arg Thr Phe Arg Val Gly Gln Ser Tyr Cys Pro Cys Cys Leu Gly  
 35 40 45

Glu Thr Pro Tyr Leu Arg Asn Glu Trp Arg Phe Ala Trp His Phe Gly  
 50 55 60

Cys Ser Lys His Gln Val Leu Leu Glu Ser Lys Cys Pro Cys Cys Gly  
 65 70 75 80

Glu Leu Tyr Gln Pro His Leu Leu Ser Ala Glu Lys Arg His Leu Asn  
 85 90 95

Tyr Cys His Gln Cys Gly Glu Lys Leu Gln Val Val Thr Thr Pro Leu  
 100 105 110

Asn Glu Val Glu Ile Ala Thr Met Glu Thr Leu Asn Asn Val Phe Met  
 115 120 125

Thr Asn Ser Gly Glu Cys Phe Arg Lys Arg Val Asn Ala Gln Val Tyr  
 130 135 140

Phe Ala Ile Leu Arg Tyr Phe Ile Asn Leu Ile Arg Arg Ala Thr Val  
 145 150 155 160

Val Lys Ser Thr His Ala Phe Ala Lys Phe Val Glu Glu Cys Gly Ile  
 165 170 175

Ser Gln Ala Glu Ile Cys Gln Thr Lys Thr Ala Leu Ala  
 180 185

<210> 195  
 <211> 492  
 <212> DNA

<213> Actinobacillus actinomycetemcomitans

<220>

<221> CDS

<222> (1)..(492)

<400> 195

acc ttg gat gtg ctt cgt tcc gaa act ttc gtt tcc gaa tta aaa ggc 48  
Thr Leu Asp Val Leu Arg Ser Glu Thr Phe Val Ser Glu Leu Lys Gly  
1 5 10 15

tta aat gct tat cgc acc acc gtg cct gtc atc ggc gga cac tcc ggt 96  
Leu Asn Ala Tyr Arg Thr Thr Val Pro Val Ile Gly Gly His Ser Gly  
20 25 30

gtg act att ctt ccg tta tta tct caa gtg caa tac gtt gaa tgg aaa 144  
Val Thr Ile Leu Pro Leu Leu Ser Gln Val Gln Tyr Val Glu Trp Lys  
35 40 45

gag gac gaa att gaa ccg tta acc aaa cgc att caa aat gcc ggc acc 192  
Glu Asp Glu Ile Glu Pro Leu Thr Lys Arg Ile Gln Asn Ala Gly Thr  
50 55 60

gaa gta gta aac gcg aaa gcc ggc ggc ggt tcc gca acc tta tcc atg 240  
Glu Val Val Asn Ala Lys Ala Gly Gly Gly Ser Ala Thr Leu Ser Met  
65 70 75 80

gcg cag gcg gca gcc cgt ttt gct aat gct gta gtc cgc ggt tta caa 288  
Ala Gln Ala Ala Ala Arg Phe Ala Asn Ala Val Val Arg Gly Leu Gln  
85 90 95

ggc gaa acc gtc gta gaa tgc agc tat gtg gaa ggc gac ggc aaa tac 336  
Gly Glu Thr Val Val Glu Cys Ser Tyr Val Glu Gly Asp Gly Lys Tyr  
100 105 110

gcc cgc ttc ttc gca caa ccg gtt cgc ttc ggc aag gaa ggt gtg gaa 384  
Ala Arg Phe Phe Ala Gln Pro Val Arg Phe Gly Lys Glu Gly Val Glu  
115 120 125

gaa atc cta cca atc ggt aaa ctc agc gcc ttg gaa caa cag gct tta 432  
Glu Ile Leu Pro Ile Gly Lys Leu Ser Ala Leu Glu Gln Gln Ala Leu  
130 135 140

gaa acc atg tta ccg aca ttg cgt gca gat att gaa tta ggt gag aag 480  
Glu Thr Met Leu Pro Thr Leu Arg Ala Asp Ile Glu Leu Gly Glu Lys  
145 150 155 160

ttt att aat cca 492  
Phe Ile Asn Pro

<210> 196

<211> 164

<212> PRT

<213> Actinobacillus actinomycetemcomitans

<400> 196

Thr Leu Asp Val Leu Arg Ser Glu Thr Phe Val Ser Glu Leu Lys Gly  
1 5 10 15

Leu Asn Ala Tyr Arg Thr Thr Val Pro Val Ile Gly Gly His Ser Gly  
20 25 30

Val Thr Ile Leu Pro Leu Leu Ser Gln Val Gln Tyr Val Glu Trp Lys  
35 40 45

Glu Asp Glu Ile Glu Pro Leu Thr Lys Arg Ile Gln Asn Ala Gly Thr  
50 55 60

Glu Val Val Asn Ala Lys Ala Gly Gly Gly Ser Ala Thr Leu Ser Met  
65 70 75 80

Ala Gln Ala Ala Ala Arg Phe Ala Asn Ala Val Val Arg Gly Leu Gln  
85 90 95

Gly Glu Thr Val Val Glu Cys Ser Tyr Val Glu Gly Asp Gly Lys Tyr  
100 105 110

Ala Arg Phe Phe Ala Gln Pro Val Arg Phe Gly Lys Glu Gly Val Glu  
115 120 125

Glu Ile Leu Pro Ile Gly Lys Leu Ser Ala Leu Glu Gln Gln Ala Leu  
130 135 140

Glu Thr Met Leu Pro Thr Leu Arg Ala Asp Ile Glu Leu Gly Glu Lys  
145 150 155 160

Phe Ile Asn Pro

<210> 197

<211> 667

<212> DNA

<213> Actinobacillus actinomycetemcomitans

<220>

<221> CDS

<222> (1)..(666)

<400> 197

gca tta agc ctg caa agt ttc aac ctt gaa gtg ccg gtt gat gat aaa

48

Ala	Leu	Ser	Leu	Gln	Ser	Phe	Asn	Leu	Glu	Val	Pro	Val	Asp	Asp	Lys	
1				5					10					15		
gaa	cgt	atc	gaa	aac	atc	aaa	cgt	tac	acc	ggc	gaa	aaa	tta	gat	acg	96
Glu	Arg	Ile	Glu	Asn	Ile	Lys	Arg	Tyr	Thr	Gly	Glu	Lys	Leu	Asp	Thr	
			20					25					30			
gcg	ttt	gtc	aac	gga	tta	gtg	gaa	gcc	tcg	agc	cgt	tta	cgt	cgc	tta	144
Ala	Phe	Val	Asn	Gly	Leu	Val	Glu	Ala	Ser	Ser	Arg	Leu	Arg	Arg	Leu	
			35				40					45				
tcc	ccg	ccg	gca	ttc	cgt	ttc	caa	tta	acc	gaa	tta	gcc	cgc	gcc	gcc	192
Ser	Pro	Pro	Ala	Phe	Arg	Phe	Gln	Leu	Thr	Glu	Leu	Ala	Arg	Ala	Ala	
	50					55					60					
caa	aaa	cgc	atc	gtc	tta	ccg	gaa	ggc	gac	gaa	ccg	cgc	acc	att	aaa	240
Gln	Lys	Arg	Ile	Val	Leu	Pro	Glu	Gly	Asp	Glu	Pro	Arg	Thr	Ile	Lys	
65				70					75					80		
gcg	gcg	att	tta	tgt	gcc	gaa	cgc	ggc	atc	gca	gaa	tgt	gtg	ctg	tta	288
Ala	Ala	Ile	Leu	Cys	Ala	Glu	Arg	Gly	Ile	Ala	Glu	Cys	Val	Leu	Leu	
				85				90					95			
gcc	aaa	ccg	gaa	gac	gta	caa	cgc	gtg	gcg	gaa	tcc	caa	ggc	gtt	aag	336
Ala	Lys	Pro	Glu	Asp	Val	Gln	Arg	Val	Ala	Glu	Ser	Gln	Gly	Val	Lys	
			100					105					110			
ttg	gta	aac	ggc	att	acc	gtt	atc	gac	ccg	gcg	agc	gtg	cgt	gaa	aac	384
Leu	Val	Asn	Gly	Ile	Thr	Val	Ile	Asp	Pro	Ala	Ser	Val	Arg	Glu	Asn	
		115					120					125				
tat	gtg	gca	cgt	ttg	gtt	gag	cta	cgc	aaa	gcc	aaa	ggc	atg	acc	gaa	432
Tyr	Val	Ala	Arg	Leu	Val	Glu	Leu	Arg	Lys	Ala	Lys	Gly	Met	Thr	Glu	
	130					135					140					
acc	atg	gcg	cgt	gaa	caa	ttg	gaa	gac	aat	gtt	gtg	ctc	ggc	acc	atg	480
Thr	Met	Ala	Arg	Glu	Gln	Leu	Glu	Asp	Asn	Val	Val	Leu	Gly	Thr	Met	
145				150					155					160		
atg	ttg	gaa	gcc	aac	caa	gta	gac	ggc	ttg	gta	tcc	ggc	gcc	gta	cac	528
Met	Leu	Glu	Ala	Asn	Gln	Val	Asp	Gly	Leu	Val	Ser	Gly	Ala	Val	His	
				165				170					175			
acc	acc	gcc	aac	acc	att	cgc	ccg	cca	atg	caa	atc	atc	aaa	acc	gca	576
Thr	Thr	Ala	Asn	Thr	Ile	Arg	Pro	Pro	Met	Gln	Ile	Ile	Lys	Thr	Ala	
			180					185					190			
ccg	ggc	agc	tcc	att	att	tct	tcc	atc	ttc	ttc	atg	ttg	cta	ccg	gat	624
Pro	Gly	Ser	Ser	Ile	Ile	Ser	Ser	Ile	Phe	Phe	Met	Leu	Leu	Pro	Asp	
		195					200					205				
caa	gta	ttg	gtc	tat	ggc	gat	tgc	gca	gtg	aac	ccg	gat	ccg	a		667
Gln	Val	Leu	Val	Tyr	Gly	Asp	Cys	Ala	Val	Asn	Pro	Asp	Pro			
	210					215					220					

<210> 198

<211> 222  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 198

Ala Leu Ser Leu Gln Ser Phe Asn Leu Glu Val Pro Val Asp Asp Lys  
 1 5 10 15

Glu Arg Ile Glu Asn Ile Lys Arg Tyr Thr Gly Glu Lys Leu Asp Thr  
 20 25 30

Ala Phe Val Asn Gly Leu Val Glu Ala Ser Ser Arg Leu Arg Arg Leu  
 35 40 45

Ser Pro Pro Ala Phe Arg Phe Gln Leu Thr Glu Leu Ala Arg Ala Ala  
 50 55 60

Gln Lys Arg Ile Val Leu Pro Glu Gly Asp Glu Pro Arg Thr Ile Lys  
 65 70 75 80

Ala Ala Ile Leu Cys Ala Glu Arg Gly Ile Ala Glu Cys Val Leu Leu  
 85 90 95

Ala Lys Pro Glu Asp Val Gln Arg Val Ala Glu Ser Gln Gly Val Lys  
 100 105 110

Leu Val Asn Gly Ile Thr Val Ile Asp Pro Ala Ser Val Arg Glu Asn  
 115 120 125

Tyr Val Ala Arg Leu Val Glu Leu Arg Lys Ala Lys Gly Met Thr Glu  
 130 135 140

Thr Met Ala Arg Glu Gln Leu Glu Asp Asn Val Val Leu Gly Thr Met  
 145 150 155 160

Met Leu Glu Ala Asn Gln Val Asp Gly Leu Val Ser Gly Ala Val His  
 165 170 175

Thr Thr Ala Asn Thr Ile Arg Pro Pro Met Gln Ile Ile Lys Thr Ala  
 180 185 190

Pro Gly Ser Ser Ile Ile Ser Ser Ile Phe Phe Met Leu Leu Pro Asp  
 195 200 205

Gln Val Leu Val Tyr Gly Asp Cys Ala Val Asn Pro Asp Pro  
 210 215 220

<210> 199  
 <211> 267  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1)..(267)

<400> 199  
 ggt ata cgc cct gag cat tta att ccg tct gat gag gca gaa gtt acg 48  
 Gly Ile Arg Pro Glu His Leu Ile Pro Ser Asp Glu Ala Glu Val Thr  
 1 5 10 15  
 ttg cgc agc aat gtg cag gtg gtg gaa ttg ctt ggt aac gaa acg caa 96  
 Leu Arg Ser Asn Val Gln Val Val Glu Leu Leu Gly Asn Glu Thr Gln  
 20 25 30  
 att cac ctt gaa atc cct gaa att aaa caa ccg acc tta att tat cgc 144  
 Ile His Leu Glu Ile Pro Glu Ile Lys Gln Pro Thr Leu Ile Tyr Arg  
 35 40 45  
 caa aat gat gtg gtg ttg gtg aag gag ggg gaa acg atg gac atc ggc 192  
 Gln Asn Asp Val Val Leu Val Lys Glu Gly Glu Thr Met Asp Ile Gly  
 50 55 60  
 atc att ccg gaa cgt tgc cat ctg ttt aaa gaa gac ggc acc gcc tgc 240  
 Ile Ile Pro Glu Arg Cys His Leu Phe Lys Glu Asp Gly Thr Ala Cys  
 65 70 75 80  
 caa cgt ttg tat aaa gaa aaa ggc gtt 267  
 Gln Arg Leu Tyr Lys Glu Lys Gly Val  
 85

<210> 200  
 <211> 89  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 200  
 Gly Ile Arg Pro Glu His Leu Ile Pro Ser Asp Glu Ala Glu Val Thr  
 1 5 10 15  
 Leu Arg Ser Asn Val Gln Val Val Glu Leu Leu Gly Asn Glu Thr Gln  
 20 25 30  
 Ile His Leu Glu Ile Pro Glu Ile Lys Gln Pro Thr Leu Ile Tyr Arg  
 35 40 45



Gln Asn Asp Val Val Leu Val Lys Glu Gly Glu Thr Met Asp Ile Gly  
 50 55 60

Ile Ile Pro Glu Arg Cys His Leu Phe Lys Glu Asp Gly Thr Ala Cys  
 65 70 75 80

Gln Arg Leu Tyr Lys Glu Lys Gly Val  
 85

<210> 201  
 <211> 219  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1)..(219)

<400> 201  
 tac atc gtc atc gcc ttt gtg gtg tca cag tta ttg gac gga aat ctg 48  
 Tyr Ile Val Ile Ala Phe Val Val Ser Gln Leu Leu Asp Gly Asn Leu  
 1 5 10 15

ctg gtg ccg ttt ttg ttc tcc gaa gcg gtc aat ctg cac ccg ttg gtg 96  
 Leu Val Pro Phe Leu Phe Ser Glu Ala Val Asn Leu His Pro Leu Val  
 20 25 30

atc atc att gcc gtt ttg att ttc ggt ggc ttg tgg gga ttc tgg ggc 144  
 Ile Ile Ile Ala Val Leu Ile Phe Gly Gly Leu Trp Gly Phe Trp Gly  
 35 40 45

gta ttt ttt gcc att ccg ctg gcg act ttg gtg aaa gcg gtg gtg aac 192  
 Val Phe Phe Ala Ile Pro Leu Ala Thr Leu Val Lys Ala Val Val Asn  
 50 55 60

gct tgg cct tcc aat gaa gcg gtg gaa 219  
 Ala Trp Pro Ser Asn Glu Ala Val Glu  
 65 70

<210> 202  
 <211> 73  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 202

Tyr Ile Val Ile Ala Phe Val Val Ser Gln Leu Leu Asp Gly Asn Leu  
 1 5 10 15

Leu Val Pro Phe Leu Phe Ser Glu Ala Val Asn Leu His Pro Leu Val

20

25

30

Ile Ile Ile Ala Val Leu Ile Phe Gly Gly Leu Trp Gly Phe Trp Gly  
 35 40 45

Val Phe Phe Ala Ile Pro Leu Ala Thr Leu Val Lys Ala Val Val Asn  
 50 55 60

Ala Trp Pro Ser Asn Glu Ala Val Glu  
 65 70

&lt;210&gt; 203

&lt;211&gt; 631

&lt;212&gt; DNA

&lt;213&gt; Actinobacillus actinomycetemcomitans

&lt;220&gt;

&lt;221&gt; CDS

&lt;222&gt; (1)..(630)

&lt;400&gt; 203

cct ttc gcc atc gaa agt gac gag aaa ttt gcc tcc gcc tgc att cgt 48  
 Pro Phe Ala Ile Glu Ser Asp Glu Lys Phe Ala Ser Ala Cys Ile Arg  
 1 5 10 15

tgc ggt cag tgc gtg caa gcc tgc cct tat gat atg ttg cat ttg gca 96  
 Cys Gly Gln Cys Val Gln Ala Cys Pro Tyr Asp Met Leu His Leu Ala  
 20 25 30

tcg ttg cta tca cca atg gaa gcg ggg acg ccg tat ttt atc gcg cgc 144  
 Ser Leu Leu Ser Pro Met Glu Ala Gly Thr Pro Tyr Phe Ile Ala Arg  
 35 40 45

gat aaa cct tgc gaa atg tgt ccg gat att cct tgc gcc cat gcg tgt 192  
 Asp Lys Pro Cys Glu Met Cys Pro Asp Ile Pro Cys Ala His Ala Cys  
 50 55 60

ccg agc ggt gcg tta gat cgt gag gcg cag gat att aat caa tcc cgt 240  
 Pro Ser Gly Ala Leu Asp Arg Glu Ala Gln Asp Ile Asn Gln Ser Arg  
 65 70 75 80

atg ggg ctg gcg gtg ttg ctg gat cat gaa acc tgc ttg aac tgg caa 288  
 Met Gly Leu Ala Val Leu Leu Asp His Glu Thr Cys Leu Asn Trp Gln  
 85 90 95

ggc ttg cgt tgc gat gtg tgt tat cgg gtt tgt ccg ttg att gat aaa 336  
 Gly Leu Arg Cys Asp Val Cys Tyr Arg Val Cys Pro Leu Ile Asp Lys  
 100 105 110

gcc att acg ctg gaa agc cat cgt aat gag cgc acc ggc aag cac gcg 384  
 Ala Ile Thr Leu Glu Ser His Arg Asn Glu Arg Thr Gly Lys His Ala  
 115 120 125

gtg ttt att ccg acg gtg cat tcc gat ggc tgt acc ggc tgt ggc aaa 432  
 Val Phe Ile Pro Thr Val His Ser Asp Gly Cys Thr Gly Cys Gly Lys  
 130 135 140

tgc gaa caa gcg tgt gtc ttg gaa gaa gcg gca atc aaa gta tta ccg 480  
 Cys Glu Gln Ala Cys Val Leu Glu Glu Ala Ala Ile Lys Val Leu Pro  
 145 150 155 160

atg cat ttg gcg aaa ggc atg tta ggc aaa cat tat cgt ttg ggt tgg 528  
 Met His Leu Ala Lys Gly Met Leu Gly Lys His Tyr Arg Leu Gly Trp  
 165 170 175

gaa gaa aag gcg aaa gcc gga cat tcc ttg gcg ccg aaa gat ttg att 576  
 Glu Glu Lys Ala Lys Ala Gly His Ser Leu Ala Pro Lys Asp Leu Ile  
 180 185 190

tcg atg ccg acc cgt atg ccg gaa gcc aca atg ccg gta atg ggc gca 624  
 Ser Met Pro Thr Arg Met Pro Glu Ala Thr Met Pro Val Met Gly Ala  
 195 200 205

gaa gac a 631  
 Glu Asp  
 210

<210> 204  
 <211> 210  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans  
 <400> 204

Pro Phe Ala Ile Glu Ser Asp Glu Lys Phe Ala Ser Ala Cys Ile Arg  
 1 5 10 15

Cys Gly Gln Cys Val Gln Ala Cys Pro Tyr Asp Met Leu His Leu Ala  
 20 25 30

Ser Leu Leu Ser Pro Met Glu Ala Gly Thr Pro Tyr Phe Ile Ala Arg  
 35 40 45

Asp Lys Pro Cys Glu Met Cys Pro Asp Ile Pro Cys Ala His Ala Cys  
 50 55 60

Pro Ser Gly Ala Leu Asp Arg Glu Ala Gln Asp Ile Asn Gln Ser Arg  
 65 70 75 80

Met Gly Leu Ala Val Leu Leu Asp His Glu Thr Cys Leu Asn Trp Gln  
 85 90 95

Gly Leu Arg Cys Asp Val Cys Tyr Arg Val Cys Pro Leu Ile Asp Lys

100	105	110
Ala Ile Thr Leu Glu Ser His Arg Asn Glu Arg Thr Gly Lys His Ala		
115	120	125
Val Phe Ile Pro Thr Val His Ser Asp Gly Cys Thr Gly Cys Gly Lys		
130	135	140
Cys Glu Gln Ala Cys Val Leu Glu Glu Ala Ala Ile Lys Val Leu Pro		
145	150	155
Met His Leu Ala Lys Gly Met Leu Gly Lys His Tyr Arg Leu Gly Trp		
	165	170
Glu Glu Lys Ala Lys Ala Gly His Ser Leu Ala Pro Lys Asp Leu Ile		
	180	185
Ser Met Pro Thr Arg Met Pro Glu Ala Thr Met Pro Val Met Gly Ala		
	195	200
		205
Glu Asp		
210		

<210> 205  
 <211> 354  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1) .. (354)

<400> 205	
tgc ctg gaa cgg gtg aaa cgg ttg gag aag caa ggg gtg att atg ggg	48
Cys Leu Glu Arg Val Lys Arg Leu Glu Lys Gln Gly Val Ile Met Gly	
1 5 10 15	
tat cgt gct ttg ctg aat ccc gca tta ttg gat tcg ccg ttg ttg gtg	96
Tyr Arg Ala Leu Leu Asn Pro Ala Leu Leu Asp Ser Pro Leu Leu Val	
20 25 30	
atc gtg gaa att acg ctg gta cgt ggc aag ccc gat gtg ttt gaa gaa	144
Ile Val Glu Ile Thr Leu Val Arg Gly Lys Pro Asp Val Phe Glu Glu	
35 40 45	
ttt aac gcg gcg gtg cag cag tta gat gaa att cag gaa tgc cat ttg	192
Phe Asn Ala Ala Val Gln Gln Leu Asp Glu Ile Gln Glu Cys His Leu	
50 55 60	

gtt tcc ggt gat ttc gat tat tta ttg aaa aca cgg gtg gcg gat atg 240  
 Val Ser Gly Asp Phe Asp Tyr Leu Leu Lys Thr Arg Val Ala Asp Met  
 65 70 75 80

gcg gcg tat cgt aaa ttg ctg ggg acc acc ttg ctg cgc ctg ccc ggg 288  
 Ala Ala Tyr Arg Lys Leu Leu Gly Thr Thr Leu Leu Arg Leu Pro Gly  
 85 90 95

gtg aac gac acg cgc act tat gtg gtg atg gaa gaa gtg aaa caa acg 336  
 Val Asn Asp Thr Arg Thr Tyr Val Val Met Glu Glu Val Lys Gln Thr  
 100 105 110

aat ttt tta cag tta aaa 354  
 Asn Phe Leu Gln Leu Lys  
 115

<210> 206  
 <211> 118  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 206

Cys Leu Glu Arg Val Lys Arg Leu Glu Lys Gln Gly Val Ile Met Gly  
 1 5 10 15

Tyr Arg Ala Leu Leu Asn Pro Ala Leu Leu Asp Ser Pro Leu Leu Val  
 20 25 30

Ile Val Glu Ile Thr Leu Val Arg Gly Lys Pro Asp Val Phe Glu Glu  
 35 40 45

Phe Asn Ala Ala Val Gln Gln Leu Asp Glu Ile Gln Glu Cys His Leu  
 50 55 60

Val Ser Gly Asp Phe Asp Tyr Leu Leu Lys Thr Arg Val Ala Asp Met  
 65 70 75 80

Ala Ala Tyr Arg Lys Leu Leu Gly Thr Thr Leu Leu Arg Leu Pro Gly  
 85 90 95

Val Asn Asp Thr Arg Thr Tyr Val Val Met Glu Glu Val Lys Gln Thr  
 100 105 110

Asn Phe Leu Gln Leu Lys  
 115

<210> 207

<211> 613  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1)..(612)

<400> 207

atg agt tta aaa ata tta tta aat cag ccg caa tac gat ccg att cgt	48
Met Ser Leu Lys Ile Leu Leu Asn Gln Pro Gln Tyr Asp Pro Ile Arg	
1 5 10 15	
gac aaa aaa gcc gag cgc aac tta ttt gcc cgt cgc gct ttg gtg tca	96
Asp Lys Lys Ala Glu Arg Asn Leu Phe Ala Arg Arg Ala Leu Val Ser	
20 25 30	
ttt atc ggc gtg ttg gtg ttg tcg gtg gtg tta att tta aac ttg tat	144
Phe Ile Gly Val Leu Val Leu Ser Val Val Leu Ile Leu Asn Leu Tyr	
35 40 45	
gat ttg cag gtg gtc aat tat gac ggt tat caa acc cgt tcc aac ggc	192
Asp Leu Gln Val Val Asn Tyr Asp Gly Tyr Gln Thr Arg Ser Asn Gly	
50 55 60	
aat cgt att aag ttg ttg ccg ctg ccg ccg act cgc ggg ttg att tat	240
Asn Arg Ile Lys Leu Leu Pro Leu Pro Pro Thr Arg Gly Leu Ile Tyr	
65 70 75 80	
gat cgc aac ggc aaa ctg ctg gcg gaa aat ctg acc ttt ttc ggg ctt	288
Asp Arg Asn Gly Lys Leu Leu Ala Glu Asn Leu Thr Phe Phe Gly Leu	
85 90 95	
tat atc gtg cct gaa aag gtg gaa aat tta gac cgc act ttt gag gag	336
Tyr Ile Val Pro Glu Lys Val Glu Asn Leu Asp Arg Thr Phe Glu Glu	
100 105 110	
ctg agg gtg ttg gta ggc tta act gat gaa gat att gcg aat ttt aac	384
Leu Arg Val Leu Val Gly Leu Thr Asp Glu Asp Ile Ala Asn Phe Asn	
115 120 125	
aag gaa cgg cgt cgc tcc tcc cgt tat atg ccg att atg ctg aaa cga	432
Lys Glu Arg Arg Arg Ser Ser Arg Tyr Met Pro Ile Met Leu Lys Arg	
130 135 140	
aat cta acg gaa gag caa att gcc cgt ttt gcg gtg aat caa tac aat	480
Asn Leu Thr Glu Glu Gln Ile Ala Arg Phe Ala Val Asn Gln Tyr Asn	
145 150 155 160	
ttc cag agt ttg gat gtg aaa ccc tac ttt aag cgc cat tat tta tac	528
Phe Gln Ser Leu Asp Val Lys Pro Tyr Phe Lys Arg His Tyr Leu Tyr	
165 170 175	
ggc gaa ccg ctg acc cat gtt ttg ggc tat gtg tca aaa att aac gat	576
Gly Glu Pro Leu Thr His Val Leu Gly Tyr Val Ser Lys Ile Asn Asp	
180 185 190	

cgt gat gta gaa cgc ttg aaa aaa gag gaa aag tac g  
 Arg Asp Val Glu Arg Leu Lys Lys Glu Glu Lys Tyr  
 195 200

613

<210> 208  
 <211> 204  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans  
 <400> 208

Met Ser Leu Lys Ile Leu Leu Asn Gln Pro Gln Tyr Asp Pro Ile Arg  
 1 5 10 15

Asp Lys Lys Ala Glu Arg Asn Leu Phe Ala Arg Arg Ala Leu Val Ser  
 20 25 30

Phe Ile Gly Val Leu Val Leu Ser Val Val Leu Ile Leu Asn Leu Tyr  
 35 40 45

Asp Leu Gln Val Val Asn Tyr Asp Gly Tyr Gln Thr Arg Ser Asn Gly  
 50 55 60

Asn Arg Ile Lys Leu Leu Pro Leu Pro Pro Thr Arg Gly Leu Ile Tyr  
 65 70 75 80

Asp Arg Asn Gly Lys Leu Leu Ala Glu Asn Leu Thr Phe Phe Gly Leu  
 85 90 95

Tyr Ile Val Pro Glu Lys Val Glu Asn Leu Asp Arg Thr Phe Glu Glu  
 100 105 110

Leu Arg Val Leu Val Gly Leu Thr Asp Glu Asp Ile Ala Asn Phe Asn  
 115 120 125

Lys Glu Arg Arg Arg Ser Ser Arg Tyr Met Pro Ile Met Leu Lys Arg  
 130 135 140

Asn Leu Thr Glu Glu Gln Ile Ala Arg Phe Ala Val Asn Gln Tyr Asn  
 145 150 155 160

Phe Gln Ser Leu Asp Val Lys Pro Tyr Phe Lys Arg His Tyr Leu Tyr  
 165 170 175

Gly Glu Pro Leu Thr His Val Leu Gly Tyr Val Ser Lys Ile Asn Asp

180

185

190

Arg Asp Val Glu Arg Leu Lys Lys Glu Glu Lys Tyr  
 195 200

&lt;210&gt; 209

&lt;211&gt; 631

&lt;212&gt; DNA

&lt;213&gt; Actinobacillus actinomycetemcomitans

&lt;220&gt;

&lt;221&gt; CDS

&lt;222&gt; (1)..(630)

&lt;400&gt; 209

cgc tta gca caa cat tca tcg gaa aaa ctg acc gca ctt tcc cat gca 48  
 Arg Leu Ala Gln His Ser Ser Glu Lys Leu Thr Ala Leu Ser His Ala  
 1 5 10 15

acc acg cat tct gac gcc caa agt gcg gta gaa aat cag agt gaa tct 96  
 Thr Thr His Ser Asp Ala Gln Ser Ala Val Glu Asn Gln Ser Glu Ser  
 20 25 30

gat agc gac gaa act gat gcg gat gtg ttg tta ggc gag gat tat cgt 144  
 Asp Ser Asp Glu Thr Asp Ala Asp Val Leu Leu Gly Glu Asp Tyr Arg  
 35 40 45

tgg gag tgg agc aac ccc gag ctt gcc aat att gag caa ggc cct aag 192  
 Trp Glu Trp Ser Asn Pro Glu Leu Ala Asn Ile Glu Gln Gly Pro Lys  
 50 55 60

ccc tcc gaa atc aaa gcc gcc att ttg cag gac atc act cct gaa tta 240  
 Pro Ser Glu Ile Lys Ala Ala Ile Leu Gln Asp Ile Thr Pro Glu Leu  
 65 70 75 80

cag caa aaa atc gtc aat tta act caa acg caa gat cgc tgg gcg cag 288  
 Gln Gln Lys Ile Val Asn Leu Thr Gln Thr Gln Asp Arg Trp Ala Gln  
 85 90 95

ctg att gag caa agc ggt gta gaa aat ctc acc aaa gag ttc gcc tta 336  
 Leu Ile Glu Gln Ser Gly Val Glu Asn Leu Thr Lys Glu Phe Ala Leu  
 100 105 110

aat acc ttc att tgg cag gaa aat gac gcg gag ttt aaa ctt ggt gtg 384  
 Asn Thr Phe Ile Trp Gln Glu Asn Asp Ala Glu Phe Lys Leu Gly Val  
 115 120 125

cgt tcc agc cac ggg cat tta aat cag gat aag cat cgg aag ctg tta 432  
 Arg Ser Ser His Gly His Leu Asn Gln Asp Lys His Arg Lys Leu Leu  
 130 135 140

caa cag gca ctt tca gtg gtg tta cag aaa gaa att gca ctg acc gtg 480  
 Gln Gln Ala Leu Ser Val Val Leu Gln Lys Glu Ile Ala Leu Thr Val  
 145 150 155 160



gaa att aac gac gac gaa caa tat ctg acg ccg acg gat tat cgc cgt 528  
 Glu Ile Asn Asp Asp Glu Gln Tyr Leu Thr Pro Thr Asp Tyr Arg Arg  
                   165                  170                  175

aaa acc tat gct caa ttg cgt gag cag gcg aaa cag gat ttg ttg caa 576  
 Lys Thr Tyr Ala Gln Leu Arg Glu Gln Ala Lys Gln Asp Leu Leu Gln  
                   180                  185                  190

gat gaa aag ttg caa cta ttg gag cgt gaa ttt gat tgt cag gtt gat 624  
 Asp Glu Lys Leu Gln Leu Leu Glu Arg Glu Phe Asp Cys Gln Val Asp  
                   195                  200                  205

gtg aaa a 631  
 Val Lys  
       210

<210> 210  
 <211> 210  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 210

Arg Leu Ala Gln His Ser Ser Glu Lys Leu Thr Ala Leu Ser His Ala  
 1                  5                  10                  15

Thr Thr His Ser Asp Ala Gln Ser Ala Val Glu Asn Gln Ser Glu Ser  
                   20                  25                  30

Asp Ser Asp Glu Thr Asp Ala Asp Val Leu Leu Gly Glu Asp Tyr Arg  
                   35                  40                  45

Trp Glu Trp Ser Asn Pro Glu Leu Ala Asn Ile Glu Gln Gly Pro Lys  
                   50                  55                  60

Pro Ser Glu Ile Lys Ala Ala Ile Leu Gln Asp Ile Thr Pro Glu Leu  
 65                  70                  75                  80

Gln Gln Lys Ile Val Asn Leu Thr Gln Thr Gln Asp Arg Trp Ala Gln  
                   85                  90                  95

Leu Ile Glu Gln Ser Gly Val Glu Asn Leu Thr Lys Glu Phe Ala Leu  
                   100                  105                  110

Asn Thr Phe Ile Trp Gln Glu Asn Asp Ala Glu Phe Lys Leu Gly Val  
                   115                  120                  125

Arg Ser Ser His Gly His Leu Asn Gln Asp Lys His Arg Lys Leu Leu

130 135 140

Gln Gln Ala Leu Ser Val Val Leu Gln Lys Glu Ile Ala Leu Thr Val  
 145 150 155 160

Glu Ile Asn Asp Asp Glu Gln Tyr Leu Thr Pro Thr Asp Tyr Arg Arg  
 165 170 175

Lys Thr Tyr Ala Gln Leu Arg Glu Gln Ala Lys Gln Asp Leu Leu Gln  
 180 185 190

Asp Glu Lys Leu Gln Leu Leu Glu Arg Glu Phe Asp Cys Gln Val Asp  
 195 200 205

Val Lys  
 210

<210> 211  
 <211> 1155  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1)..(1155)

<400> 211

ccc gaa cat ata aaa gac aag gta tcg aga ggt ttc att atg gca agt	48
Pro Glu His Ile Lys Asp Lys Val Ser Arg Gly Phe Ile Met Ala Ser	
1 5 10 15	
gta aca ttg cgc aat gtg ggc aaa tct tac gga aac gta cat att tcc	96
Val Thr Leu Arg Asn Val Gly Lys Ser Tyr Gly Asn Val His Ile Ser	
20 25 30	
aaa gat att aat ttg gat att gaa gaa ggc gaa ttt gtc gtc ttt gtc	144
Lys Asp Ile Asn Leu Asp Ile Glu Glu Gly Glu Phe Val Val Phe Val	
35 40 45	
gga ccg tcc ggt tgc ggt aaa tcc aca tta ttg cga atg att gcc gga	192
Gly Pro Ser Gly Cys Gly Lys Ser Thr Leu Leu Arg Met Ile Ala Gly	
50 55 60	
ctt gag gat att acc acc ggt gaa ctt tac atc ggt gaa aaa cgg atg	240
Leu Glu Asp Ile Thr Thr Gly Glu Leu Tyr Ile Gly Glu Lys Arg Met	
65 70 75 80	
aac gat gtg ccg ccg gca aag cgc ggt atc ggt atg gtg ttc caa tct	288
Asn Asp Val Pro Pro Ala Lys Arg Gly Ile Gly Met Val Phe Gln Ser	
85 90 95	

tac gcc ctg tac ccg cac ttg gat gtg gca gaa aat atg tct ttc ggg	336
Tyr Ala Leu Tyr Pro His Leu Asp Val Ala Glu Asn Met Ser Phe Gly	
100 105 110	
ctg aaa tta gcc ggt gta aat aaa acg gaa cgg gat cag cgc gtt aat	384
Leu Lys Leu Ala Gly Val Asn Lys Thr Glu Arg Asp Gln Arg Val Asn	
115 120 125	
cag gtt gcc gaa att tta cag ctt gcc cat ttg ctt gaa cgt aaa ccg	432
Gln Val Ala Glu Ile Leu Gln Leu Ala His Leu Leu Glu Arg Lys Pro	
130 135 140	
aaa gcc ttg tcg ggc ggt cag cgt caa cgt gtg gcg att ggg cga acc	480
Lys Ala Leu Ser Gly Gly Gln Arg Gln Arg Val Ala Ile Gly Arg Thr	
145 150 155 160	
ctt gtt tcc cag cca gaa gta ttc ttg ctg gac gaa ccg ctt tcc aac	528
Leu Val Ser Gln Pro Glu Val Phe Leu Leu Asp Glu Pro Leu Ser Asn	
165 170 175	
tta gat gcc gcc ttg cgc gta caa atg cgg gtg gaa atc tcc aaa tta	576
Leu Asp Ala Ala Leu Arg Val Gln Met Arg Val Glu Ile Ser Lys Leu	
180 185 190	
cac aaa aaa ctc aac cgc acc atg att tat gtt acc cat gac caa gtg	624
His Lys Lys Leu Asn Arg Thr Met Ile Tyr Val Thr His Asp Gln Val	
195 200 205	
gaa gcc atg acc ctg gcg gac aaa atc gtg gtg ttg aat gcg ggc ggt	672
Glu Ala Met Thr Leu Ala Asp Lys Ile Val Val Leu Asn Ala Gly Gly	
210 215 220	
att gcg cag gtg ggg aaa ccg ctg gaa ctt tac cat tat ccg caa aat	720
Ile Ala Gln Val Gly Lys Pro Leu Glu Leu Tyr His Tyr Pro Gln Asn	
225 230 235 240	
cgt ttc gtg gcc ggt ttt atc ggt tca ccg aaa atg aat ttc ctg ccg	768
Arg Phe Val Ala Gly Phe Ile Gly Ser Pro Lys Met Asn Phe Leu Pro	
245 250 255	
gtg aaa gtg act gct gtg gaa aaa gag cgg gtg caa atc gaa ttg ccc	816
Val Lys Val Thr Ala Val Glu Lys Glu Arg Val Gln Ile Glu Leu Pro	
260 265 270	
gac gcc aac cat cat aac ttc tgg atc ccg gtt tcc ggt aat ggc gtg	864
Asp Ala Asn His His Asn Phe Trp Ile Pro Val Ser Gly Asn Gly Val	
275 280 285	
aaa gtg ggt gaa aac ctt tca tta ggt ata cgc cct gag cat tta att	912
Lys Val Gly Glu Asn Leu Ser Leu Gly Ile Arg Pro Glu His Leu Ile	
290 295 300	
ccg tct gat gag gca gaa gtt acg ttg cgc agc aat gtg cag gtg gtg	960
Pro Ser Asp Glu Ala Glu Val Thr Leu Arg Ser Asn Val Gln Val Val	
305 310 315 320	
gaa ttg ctt ggt aac gaa acg caa att cac ctt gaa atc cct gaa att	1008

Glu Leu Leu Gly Asn Glu Thr Gln Ile His Leu Glu Ile Pro Glu Ile  
 325 330 335  
 aaa caa ccg acc tta att tat cgc caa aat gat gtg gtg ttg gtg aag 1056  
 Lys Gln Pro Thr Leu Ile Tyr Arg Gln Asn Asp Val Val Leu Val Lys  
 340 345 350  
 gag ggg gaa acg atg gac atc ggc atc att ccg gaa cgt tgc cat ctg 1104  
 Glu Gly Glu Thr Met Asp Ile Gly Ile Ile Pro Glu Arg Cys His Leu  
 355 360 365  
 ttt aaa gaa gac ggc acc gcc tgc caa cgt ttg tat aaa gaa aaa ggc 1152  
 Phe Lys Glu Asp Gly Thr Ala Cys Gln Arg Leu Tyr Lys Glu Lys Gly  
 370 375 380  
 gtt 1155  
 Val  
 385

<210> 212  
 <211> 385  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans  
 <400> 212

Pro Glu His Ile Lys Asp Lys Val Ser Arg Gly Phe Ile Met Ala Ser  
 1 5 10 15

Val Thr Leu Arg Asn Val Gly Lys Ser Tyr Gly Asn Val His Ile Ser  
 20 25 30

Lys Asp Ile Asn Leu Asp Ile Glu Glu Gly Glu Phe Val Val Phe Val  
 35 40 45

Gly Pro Ser Gly Cys Gly Lys Ser Thr Leu Leu Arg Met Ile Ala Gly  
 50 55 60

Leu Glu Asp Ile Thr Thr Gly Glu Leu Tyr Ile Gly Glu Lys Arg Met  
 65 70 75 80

Asn Asp Val Pro Pro Ala Lys Arg Gly Ile Gly Met Val Phe Gln Ser  
 85 90 95

Tyr Ala Leu Tyr Pro His Leu Asp Val Ala Glu Asn Met Ser Phe Gly  
 100 105 110

Leu Lys Leu Ala Gly Val Asn Lys Thr Glu Arg Asp Gln Arg Val Asn  
 115 120 125

Gln Val Ala Glu Ile Leu Gln Leu Ala His Leu Leu Glu Arg Lys Pro  
 130 135 140

Lys Ala Leu Ser Gly Gly Gln Arg Gln Arg Val Ala Ile Gly Arg Thr  
 145 150 155 160

Leu Val Ser Gln Pro Glu Val Phe Leu Leu Asp Glu Pro Leu Ser Asn  
 165 170 175

Leu Asp Ala Ala Leu Arg Val Gln Met Arg Val Glu Ile Ser Lys Leu  
 180 185 190

His Lys Lys Leu Asn Arg Thr Met Ile Tyr Val Thr His Asp Gln Val  
 195 200 205

Glu Ala Met Thr Leu Ala Asp Lys Ile Val Val Leu Asn Ala Gly Gly  
 210 215 220

Ile Ala Gln Val Gly Lys Pro Leu Glu Leu Tyr His Tyr Pro Gln Asn  
 225 230 235 240

Arg Phe Val Ala Gly Phe Ile Gly Ser Pro Lys Met Asn Phe Leu Pro  
 245 250 255

Val Lys Val Thr Ala Val Glu Lys Glu Arg Val Gln Ile Glu Leu Pro  
 260 265 270

Asp Ala Asn His His Asn Phe Trp Ile Pro Val Ser Gly Asn Gly Val  
 275 280 285

Lys Val Gly Glu Asn Leu Ser Leu Gly Ile Arg Pro Glu His Leu Ile  
 290 295 300

Pro Ser Asp Glu Ala Glu Val Thr Leu Arg Ser Asn Val Gln Val Val  
 305 310 315 320

Glu Leu Leu Gly Asn Glu Thr Gln Ile His Leu Glu Ile Pro Glu Ile  
 325 330 335

Lys Gln Pro Thr Leu Ile Tyr Arg Gln Asn Asp Val Val Leu Val Lys  
 340 345 350

Glu Gly Glu Thr Met Asp Ile Gly Ile Ile Pro Glu Arg Cys His Leu  
 355 360 365

Phe Lys Glu Asp Gly Thr Ala Cys Gln Arg Leu Tyr Lys Glu Lys Gly  
 370 375 380

Val  
 385

<210> 213  
 <211> 447  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1)..(447)

<400> 213  
 atg cca aaa aat gcg caa ttc tac ctg ctt tcc gat gcc tct ccc gca 48  
 Met Pro Lys Asn Ala Gln Phe Tyr Leu Leu Ser Asp Ala Ser Pro Ala  
 1 5 10 15

cag acg aat ttg tct gcg gtg gaa agc ctt gcc tgc aat ttg gcg gcg 96  
 Gln Thr Asn Leu Ser Ala Val Glu Ser Leu Ala Cys Asn Leu Ala Ala  
 20 25 30

tcc gcc tgg cgt ttg gga aaa cgg gtt ctg ttg gcg tgt gaa aat gaa 144  
 Ser Ala Trp Arg Leu Gly Lys Arg Val Leu Leu Ala Cys Glu Asn Glu  
 35 40 45

gcg cag gcg ctc aat att gat gaa gcc ctt tgg caa cgg gaa ccg gac 192  
 Ala Gln Ala Leu Asn Ile Asp Glu Ala Leu Trp Gln Arg Glu Pro Asp  
 50 55 60

gaa ttc gtc ccg cac aac ctt tcc ggc gaa gcc acc acg tat gcc acg 240  
 Glu Phe Val Pro His Asn Leu Ser Gly Glu Ala Thr Thr Tyr Ala Thr  
 65 70 75 80

ccc atc gaa atc agc tgg acg ggc aaa cgc aac gca caa agc cgc gat 288  
 Pro Ile Glu Ile Ser Trp Thr Gly Lys Arg Asn Ala Gln Ser Arg Asp  
 85 90 95

ttg ctg att aat tta caa ccg cag ctg ccg gaa ttc atc aac agc ttt 336  
 Leu Leu Ile Asn Leu Gln Pro Gln Leu Pro Glu Phe Ile Asn Ser Phe  
 100 105 110

aac caa att atc gat ttc gta ccc gcc gaa gaa caa caa aaa gct tta 384  
 Asn Gln Ile Ile Asp Phe Val Pro Ala Glu Glu Gln Gln Lys Ala Leu  
 115 120 125

gcg cgg gaa cgt tat aaa caa ttg agg cag ttg ggc tgg gaa ttg agt 432  
 Ala Arg Glu Arg Tyr Lys Gln Leu Arg Gln Leu Gly Trp Glu Leu Ser

130

135

140

acg gag cag gcg ggg  
 Thr Glu Gln Ala Gly  
 145

447

<210> 214  
 <211> 149  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 214

Met Pro Lys Asn Ala Gln Phe Tyr Leu Leu Ser Asp Ala Ser Pro Ala  
 1 5 10 15

Gln Thr Asn Leu Ser Ala Val Glu Ser Leu Ala Cys Asn Leu Ala Ala  
 20 25 30

Ser Ala Trp Arg Leu Gly Lys Arg Val Leu Leu Ala Cys Glu Asn Glu  
 35 40 45

Ala Gln Ala Leu Asn Ile Asp Glu Ala Leu Trp Gln Arg Glu Pro Asp  
 50 55 60

Glu Phe Val Pro His Asn Leu Ser Gly Glu Ala Thr Thr Tyr Ala Thr  
 65 70 75 80

Pro Ile Glu Ile Ser Trp Thr Gly Lys Arg Asn Ala Gln Ser Arg Asp  
 85 90 95

Leu Leu Ile Asn Leu Gln Pro Gln Leu Pro Glu Phe Ile Asn Ser Phe  
 100 105 110

Asn Gln Ile Ile Asp Phe Val Pro Ala Glu Glu Gln Gln Lys Ala Leu  
 115 120 125

Ala Arg Glu Arg Tyr Lys Gln Leu Arg Gln Leu Gly Trp Glu Leu Ser  
 130 135 140

Thr Glu Gln Ala Gly  
 145

<210> 215  
 <211> 774  
 <212> DNA

<213> Actinobacillus actinomycetemcomitans

<220>

<221> CDS

<222> (1)..(774)

<400> 215

aaa	gac	aac	aaa	atc	tgg	cac	ttc	acc	tta	cga	aaa	gaa	gca	ata	tgg	48
Lys	Asp	Asn	Lys	Ile	Trp	His	Phe	Thr	Leu	Arg	Lys	Glu	Ala	Ile	Trp	
1				5					10					15		

tct	aac	ggc	gaa	ccg	gtg	act	gcg	cag	caa	ttt	gtt	gca	agc	tgg	caa	96
Ser	Asn	Gly	Glu	Pro	Val	Thr	Ala	Gln	Gln	Phe	Val	Ala	Ser	Trp	Gln	
			20					25					30			

cgg	ctg	gcg	caa	tcg	gat	tct	cct	tta	aag	cac	tat	tta	cgc	tac	ctt	144
Arg	Leu	Ala	Gln	Ser	Asp	Ser	Pro	Leu	Lys	His	Tyr	Leu	Arg	Tyr	Leu	
		35					40					45				

aac	tta	gtc	aac	gcg	gag	aaa	gtg	tta	cag	caa	act	ctg	ctg	cca	gag	192
Asn	Leu	Val	Asn	Ala	Glu	Lys	Val	Leu	Gln	Gln	Thr	Leu	Leu	Pro	Glu	
	50					55					60					

cag	ttg	gga	att	gtc	gcg	gaa	aat	gac	cgc	act	tta	cgc	tta	act	tta	240
Gln	Leu	Gly	Ile	Val	Ala	Glu	Asn	Asp	Arg	Thr	Leu	Arg	Leu	Thr	Leu	
65					70				75					80		

gat	aaa	gcg	acc	cct	tac	ttg	ccg	caa	atg	ctg	gcg	cat	atc	agc	ctg	288
Asp	Lys	Ala	Thr	Pro	Tyr	Leu	Pro	Gln	Met	Leu	Ala	His	Ile	Ser	Leu	
				85					90					95		

ttg	cca	caa	tat	ttg	tcg	cca	cat	gaa	ggc	att	gtg	acc	aac	ggg	gcg	336
Leu	Pro	Gln	Tyr	Leu	Ser	Pro	His	Glu	Gly	Ile	Val	Thr	Asn	Gly	Ala	
			100					105					110			

tat	caa	gtg	atg	ggg	cag	caa	ggc	aat	ctc	atc	cat	ttg	gaa	aag	aac	384
Tyr	Gln	Val	Met	Gly	Gln	Gln	Gly	Asn	Leu	Ile	His	Leu	Glu	Lys	Asn	
		115					120					125				

ccg	caa	tat	tgg	gcg	aaa	gaa	aaa	gtg	gcg	ttt	aaa	aat	gtg	gat	tat	432
Pro	Gln	Tyr	Trp	Ala	Lys	Glu	Lys	Val	Ala	Phe	Lys	Asn	Val	Asp	Tyr	
	130					135					140					

cag	aaa	atc	gca	ctg	caa	cag	gac	gtc	agc	gcc	tta	gat	gtg	gtg	tgg	480
Gln	Lys	Ile	Ala	Leu	Gln	Gln	Asp	Val	Ser	Ala	Leu	Asp	Val	Val	Trp	
145					150				155						160	

cag	ccg	cag	caa	caa	acg	gat	caa	acg	caa	tac	ttc	ccg	caa	ctt	tgc	528
Gln	Pro	Gln	Gln	Gln	Thr	Asp	Gln	Thr	Gln	Tyr	Phe	Pro	Gln	Leu	Cys	
				165					170					175		

acc	tat	ttt	tac	acc	ttt	aat	ttt	aac	atg	cca	caa	ctg	gcg	caa	agc	576
Thr	Tyr	Phe	Tyr	Thr	Phe	Asn	Phe	Asn	Met	Pro	Gln	Leu	Ala	Gln	Ser	
			180					185				190				

ccg	gtg	cgt	aag	gca	ttg	gca	atg	atg	aca	tct	gcc	cgc	agt	tta	ttg	624
Pro	Val	Arg	Lys	Ala	Leu	Ala	Met	Met	Thr	Ser	Ala	Arg	Ser	Leu	Leu	



195	200	205	
ccg gaa agt aaa aac agg att cct tta acg gat aat ttt tta cca att			672
Pro Glu Ser Lys Asn Arg Ile Pro Leu Thr Asp Asn Phe Leu Pro Ile			
210	215	220	
tcc atg caa acc atc gat agc cgg tgg gag caa acg ccg gtt gaa caa			720
Ser Met Gln Thr Ile Asp Ser Arg Trp Glu Gln Thr Pro Val Glu Gln			
225	230	235	240
tta tta agc caa gcg cga att gga gag aag gca ccg ctc aaa ctg acc			768
Leu Leu Ser Gln Ala Arg Ile Gly Glu Lys Ala Pro Leu Lys Leu Thr			
	245	250	255
cta agt			774
Leu Ser			

<210> 216  
 <211> 258  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 216

Lys Asp Asn Lys Ile Trp His Phe Thr Leu Arg Lys Glu Ala Ile Trp
1 5 10 15

Ser Asn Gly Glu Pro Val Thr Ala Gln Gln Phe Val Ala Ser Trp Gln
20 25 30

Arg Leu Ala Gln Ser Asp Ser Pro Leu Lys His Tyr Leu Arg Tyr Leu
35 40 45

Asn Leu Val Asn Ala Glu Lys Val Leu Gln Gln Thr Leu Leu Pro Glu
50 55 60

Gln Leu Gly Ile Val Ala Glu Asn Asp Arg Thr Leu Arg Leu Thr Leu
65 70 75 80

Asp Lys Ala Thr Pro Tyr Leu Pro Gln Met Leu Ala His Ile Ser Leu
85 90 95

Leu Pro Gln Tyr Leu Ser Pro His Glu Gly Ile Val Thr Asn Gly Ala
100 105 110

Tyr Gln Val Met Gly Gln Gln Gly Asn Leu Ile His Leu Glu Lys Asn
115 120 125

Pro Gln Tyr Trp Ala Lys Glu Lys Val Ala Phe Lys Asn Val Asp Tyr  
 130 135 140

Gln Lys Ile Ala Leu Gln Gln Asp Val Ser Ala Leu Asp Val Val Trp  
 145 150 155 160

Gln Pro Gln Gln Gln Thr Asp Gln Thr Gln Tyr Phe Pro Gln Leu Cys  
 165 170 175

Thr Tyr Phe Tyr Thr Phe Asn Phe Asn Met Pro Gln Leu Ala Gln Ser  
 180 185 190

Pro Val Arg Lys Ala Leu Ala Met Met Thr Ser Ala Arg Ser Leu Leu  
 195 200 205

Pro Glu Ser Lys Asn Arg Ile Pro Leu Thr Asp Asn Phe Leu Pro Ile  
 210 215 220

Ser Met Gln Thr Ile Asp Ser Arg Trp Glu Gln Thr Pro Val Glu Gln  
 225 230 235 240

Leu Leu Ser Gln Ala Arg Ile Gly Glu Lys Ala Pro Leu Lys Leu Thr  
 245 250 255

Leu Ser

<210> 217  
 <211> 363  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1)..(363)

<400> 217  
 atc cgt att caa ccg gac gaa ggc att tct atg cgt ttt ggc ttg aaa 48  
 Ile Arg Ile Gln Pro Asp Glu Gly Ile Ser Met Arg Phe Gly Leu Lys  
 1 5 10 15  
 aaa ccg ggc gcc ggc ttt gaa gcc aaa gaa gtg tcg atg gat ttc cgc 96  
 Lys Pro Gly Ala Gly Phe Glu Ala Lys Glu Val Ser Met Asp Phe Arg  
 20 25 30  
 tat gcc gat ctt gcg ggt gcc acc gtc atg acc gct tat gag cgt tta 144  
 Tyr Ala Asp Leu Ala Gly Ala Thr Val Met Thr Ala Tyr Glu Arg Leu

35	40	45	
ttg ctt gat gcc atg aaa ggc gac gcg acc cta ttt gcg cgt acc gat			192
Leu Leu Asp Ala Met Lys Gly Asp Ala Thr Leu Phe Ala Arg Thr Asp			
50	55	60	
gcc gta cac gcc gcc tgg aaa ttc gtt caa ccg att ttg aac tat aaa			240
Ala Val His Ala Ala Trp Lys Phe Val Gln Pro Ile Leu Asn Tyr Lys			
65	70	75	80
gcc caa ggc ggc aga ctt tat gat tac gag gcc ggc acc tgg gga ccg			288
Ala Gln Gly Gly Arg Leu Tyr Asp Tyr Glu Ala Gly Thr Trp Gly Pro			
	85	90	95
acg gca gcc gat aaa ctc atc gcc aaa agc ggt cgt gta tgg cgc cgc			336
Thr Ala Ala Asp Lys Leu Ile Ala Lys Ser Gly Arg Val Trp Arg Arg			
	100	105	110
cca agc ggg ttg atg aag aaa aaa gtg			363
Pro Ser Gly Leu Met Lys Lys Lys Val			
	115	120	
<210> 218			
<211> 121			
<212> PRT			
<213> Actinobacillus actinomycetemcomitans			
<400> 218			
Ile Arg Ile Gln Pro Asp Glu Gly Ile Ser Met Arg Phe Gly Leu Lys			
1	5	10	15
Lys Pro Gly Ala Gly Phe Glu Ala Lys Glu Val Ser Met Asp Phe Arg			
	20	25	30
Tyr Ala Asp Leu Ala Gly Ala Thr Val Met Thr Ala Tyr Glu Arg Leu			
	35	40	45
Leu Leu Asp Ala Met Lys Gly Asp Ala Thr Leu Phe Ala Arg Thr Asp			
50	55	60	
Ala Val His Ala Ala Trp Lys Phe Val Gln Pro Ile Leu Asn Tyr Lys			
65	70	75	80
Ala Gln Gly Gly Arg Leu Tyr Asp Tyr Glu Ala Gly Thr Trp Gly Pro			
	85	90	95
Thr Ala Ala Asp Lys Leu Ile Ala Lys Ser Gly Arg Val Trp Arg Arg			
	100	105	110

Pro Ser Gly Leu Met Lys Lys Lys Val  
 115 120

<210> 219  
 <211> 159  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1)..(159)

<400> 219  
 atg gca aca ggc aaa agc att att tta atg gga gtt tcc agt aca gga 48  
 Met Ala Thr Gly Lys Ser Ile Ile Leu Met Gly Val Ser Ser Thr Gly  
 1 5 10 15  
 aaa aca tca gtg ggg acg gaa gta gca cgt cgt ttg gag ata aaa ctg 96  
 Lys Thr Ser Val Gly Thr Glu Val Ala Arg Arg Leu Glu Ile Lys Leu  
 20 25 30  
 att gat ggc gat gat ctg cac ccg cgc gcc aat atc ata aaa atg ggc 144  
 Ile Asp Gly Asp Asp Leu His Pro Arg Ala Asn Ile Ile Lys Met Gly  
 35 40 45  
 gaa gga cat ccg ctc 159  
 Glu Gly His Pro Leu  
 50

<210> 220  
 <211> 53  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 220  
 Met Ala Thr Gly Lys Ser Ile Ile Leu Met Gly Val Ser Ser Thr Gly  
 1 5 10 15  
 Lys Thr Ser Val Gly Thr Glu Val Ala Arg Arg Leu Glu Ile Lys Leu  
 20 25 30  
 Ile Asp Gly Asp Asp Leu His Pro Arg Ala Asn Ile Ile Lys Met Gly  
 35 40 45  
 Glu Gly His Pro Leu  
 50

<210> 221  
 <211> 289

<212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1)..(288)

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<400> 221
aac att gct tat gcg gcg aaa gac aaa tac agt cgt gaa gaa atc atc      48
Asn Ile Ala Tyr Ala Ala Lys Asp Lys Tyr Ser Arg Glu Glu Ile Ile
1           5           10           15

aaa gcg gca aaa gcg gcg cac gcc atg gaa ttt atc gag cat ttg gaa      96
Lys Ala Ala Lys Ala Ala His Ala Met Glu Phe Ile Glu His Leu Glu
           20           25           30

aac ggt ctg gat acg gtt atc ggc gaa aac ggc gcc agc tta tcc ggc      144
Asn Gly Leu Asp Thr Val Ile Gly Glu Asn Gly Ala Ser Leu Ser Gly
           35           40           45

ggt caa cgc cag cgt tta gcc atc gcc cgc gcc ttg ttg cgt aac tcg      192
Gly Gln Arg Gln Arg Leu Ala Ile Ala Arg Ala Leu Leu Arg Asn Ser
           50           55           60

ccg gta ttg att tta gat gaa gcc acc tcg gca ttg gat acg gaa tcc      240
Pro Val Leu Ile Leu Asp Glu Ala Thr Ser Ala Leu Asp Thr Glu Ser
65           70           75           80

gaa cgc gca att caa gcg gca ttg gaa gaa atc caa aaa gat cgc acg g      289
Glu Arg Ala Ile Gln Ala Ala Leu Glu Glu Ile Gln Lys Asp Arg Thr
           85           90           95

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<210> 222  
 <211> 96  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

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<400> 222

Asn Ile Ala Tyr Ala Ala Lys Asp Lys Tyr Ser Arg Glu Glu Ile Ile
1           5           10           15

Lys Ala Ala Lys Ala Ala His Ala Met Glu Phe Ile Glu His Leu Glu
           20           25           30

Asn Gly Leu Asp Thr Val Ile Gly Glu Asn Gly Ala Ser Leu Ser Gly
           35           40           45

Gly Gln Arg Gln Arg Leu Ala Ile Ala Arg Ala Leu Leu Arg Asn Ser
           50           55           60

Pro Val Leu Ile Leu Asp Glu Ala Thr Ser Ala Leu Asp Thr Glu Ser

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65

70

75

80

Glu Arg Ala Ile Gln Ala Ala Leu Glu Glu Ile Gln Lys Asp Arg Thr  
 85 90 95

&lt;210&gt; 223

&lt;211&gt; 353

&lt;212&gt; DNA

&lt;213&gt; Actinobacillus actinomycetemcomitans

&lt;220&gt;

&lt;221&gt; CDS

&lt;222&gt; (1) .. (351)

&lt;400&gt; 223

tcg aac atc aac cct gat gat cca agt gcg att atc gaa ggc aac gaa 48  
 Ser Asn Ile Asn Pro Asp Asp Pro Ser Ala Ile Ile Glu Gly Asn Glu  
 1 5 10 15

aaa gtg gtt cgc cct cgt tta acc gac gcg gaa ttc ttc tcc aaa acc 96  
 Lys Val Val Arg Pro Arg Leu Thr Asp Ala Glu Phe Phe Ser Lys Thr  
 20 25 30

gac tta aaa caa aaa tta gtg gat cgc tta ccg cgc ttg gaa act gtg 144  
 Asp Leu Lys Gln Lys Leu Val Asp Arg Leu Pro Arg Leu Glu Thr Val  
 35 40 45

ttg ttc caa caa caa ctt ggc aca ttg cgt gat aaa acc gac cgc atc 192  
 Leu Phe Gln Gln Gln Leu Gly Thr Leu Arg Asp Lys Thr Asp Arg Ile  
 50 55 60

gaa caa ctt gcg ggt gca atc gcc aaa caa atc ggt gcc gac gaa gcg 240  
 Glu Gln Leu Ala Gly Ala Ile Ala Lys Gln Ile Gly Ala Asp Glu Ala  
 65 70 75 80

aaa gca aaa cgt gcg ggc ttg ctg tca aaa tgc gat ttg atg acc aat 288  
 Lys Ala Lys Arg Ala Gly Leu Leu Ser Lys Cys Asp Leu Met Thr Asn  
 85 90 95

atg gtg ttt gaa ttc acc gac acc caa ggc gta atg ggt atg cac tat 336  
 Met Val Phe Glu Phe Thr Asp Thr Gln Gly Val Met Gly Met His Tyr  
 100 105 110

gcc cgt cac gac ggc ga 353  
 Ala Arg His Asp Gly  
 115

&lt;210&gt; 224

&lt;211&gt; 117

&lt;212&gt; PRT

&lt;213&gt; Actinobacillus actinomycetemcomitans

&lt;400&gt; 224

Ser Asn Ile Asn Pro Asp Asp Pro Ser Ala Ile Ile Glu Gly Asn Glu  
1 5 10 15

Lys Val Val Arg Pro Arg Leu Thr Asp Ala Glu Phe Phe Ser Lys Thr  
20 25 30

Asp Leu Lys Gln Lys Leu Val Asp Arg Leu Pro Arg Leu Glu Thr Val  
35 40 45

Leu Phe Gln Gln Gln Leu Gly Thr Leu Arg Asp Lys Thr Asp Arg Ile  
50 55 60

Glu Gln Leu Ala Gly Ala Ile Ala Lys Gln Ile Gly Ala Asp Glu Ala  
65 70 75 80

Lys Ala Lys Arg Ala Gly Leu Leu Ser Lys Cys Asp Leu Met Thr Asn  
85 90 95

Met Val Phe Glu Phe Thr Asp Thr Gln Gly Val Met Gly Met His Tyr  
100 105 110

Ala Arg His Asp Gly  
115

<210> 225  
<211> 366  
<212> DNA  
<213> Actinobacillus actinomycetemcomitans

<220>  
<221> CDS  
<222> (1)..(366)

<400> 225  
cta ttg gaa aaa caa ggg tta att aaa tta aaa gat ccg acc aac ctg 48  
Leu Leu Glu Lys Gln Gly Leu Ile Lys Leu Lys Asp Pro Thr Asn Leu  
1 5 10 15

ttc tcc act tct ata gat atc att gaa aat ccg aaa aat tta caa atc 96  
Phe Ser Thr Ser Ile Asp Ile Ile Glu Asn Pro Lys Asn Leu Gln Ile  
20 25 30

aaa gaa gtg gat acc tcc gtt gcg gca cgt gcc tta gat gac gtt gat 144  
Lys Glu Val Asp Thr Ser Val Ala Ala Arg Ala Leu Asp Asp Val Asp  
35 40 45

ttg gcg gta gtg aat aac aac tac gcc ggt caa gta ggc tta aat gcg 192  
Leu Ala Val Val Asn Asn Asn Tyr Ala Gly Gln Val Gly Leu Asn Ala  
50 55 60

caa gat cac ggc gta ttt gtg gaa gat aaa gat tca ccg tat gta aat 240  
 Gln Asp His Gly Val Phe Val Glu Asp Lys Asp Ser Pro Tyr Val Asn  
 65 70 75 80

att atc gtg gca cgg acc gat aac aaa gac agc aaa gcc gta cag act 288  
 Ile Ile Val Ala Arg Thr Asp Asn Lys Asp Ser Lys Ala Val Gln Thr  
 85 90 95

ttc gtg aaa gcc tac caa acc ccg gaa gtg gaa caa gaa gcg aaa aaa 336  
 Phe Val Lys Ala Tyr Gln Thr Pro Glu Val Glu Gln Glu Ala Lys Lys  
 100 105 110

cac ttt aaa gac ggc gtg gta aaa ggc tgg 366  
 His Phe Lys Asp Gly Val Val Lys Gly Trp  
 115 120

<210> 226  
 <211> 122  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 226

Leu Leu Glu Lys Gln Gly Leu Ile Lys Leu Lys Asp Pro Thr Asn Leu  
 1 5 10 15

Phe Ser Thr Ser Ile Asp Ile Ile Glu Asn Pro Lys Asn Leu Gln Ile  
 20 25 30

Lys Glu Val Asp Thr Ser Val Ala Ala Arg Ala Leu Asp Asp Val Asp  
 35 40 45

Leu Ala Val Val Asn Asn Asn Tyr Ala Gly Gln Val Gly Leu Asn Ala  
 50 55 60

Gln Asp His Gly Val Phe Val Glu Asp Lys Asp Ser Pro Tyr Val Asn  
 65 70 75 80

Ile Ile Val Ala Arg Thr Asp Asn Lys Asp Ser Lys Ala Val Gln Thr  
 85 90 95

Phe Val Lys Ala Tyr Gln Thr Pro Glu Val Glu Gln Glu Ala Lys Lys  
 100 105 110

His Phe Lys Asp Gly Val Val Lys Gly Trp  
 115 120



<210> 227  
 <211> 465  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1)..(465)

<400> 227  
 atg act tgg caa aac gtg tcg atc atc gtt agt tat cct caa act gac 48  
 Met Thr Trp Gln Asn Val Ser Ile Ile Val Ser Tyr Pro Gln Thr Asp  
 1 5 10 15  
 ata aaa agg gga tct ttt atg aac ttg aaa aaa tta tta ggc gtc gca 96  
 Ile Lys Arg Gly Ser Phe Met Asn Leu Lys Lys Leu Leu Gly Val Ala  
 20 25 30  
 aca tta gcc tcc gta ttc gcc tta acg gct tgt aat gaa gag aaa aaa 144  
 Thr Leu Ala Ser Val Phe Ala Leu Thr Ala Cys Asn Glu Glu Lys Lys  
 35 40 45  
 ccg gaa gcc gca ccg gca gac aaa ccg gcg gca gaa gcc ccg gca aca 192  
 Pro Glu Ala Ala Pro Ala Asp Lys Pro Ala Ala Glu Ala Pro Ala Thr  
 50 55 60  
 atc aaa gtg ggc gtg atg gca gga ccg gaa cac caa gtg gct gaa atc 240  
 Ile Lys Val Gly Val Met Ala Gly Pro Glu His Gln Val Ala Glu Ile  
 65 70 75 80  
 gca gcg aaa gtg gca aaa gaa aaa tac aac tta gac gta gaa tac gtt 288  
 Ala Ala Lys Val Ala Lys Glu Lys Tyr Asn Leu Asp Val Glu Tyr Val  
 85 90 95  
 tta ttc aat gac tac gcc ttg cca aac act gca gtg tct aaa ggt gat 336  
 Leu Phe Asn Asp Tyr Ala Leu Pro Asn Thr Ala Val Ser Lys Gly Asp  
 100 105 110  
 tta gac gtt aac gca atg caa cat aaa ccg tat tta gac aaa gat tcc 384  
 Leu Asp Val Asn Ala Met Gln His Lys Pro Tyr Leu Asp Lys Asp Ser  
 115 120 125  
 caa gcg aaa gga ttg aac aac tta gtg atc gtg ggt aat acc ttc gtt 432  
 Gln Ala Lys Gly Leu Asn Asn Leu Val Ile Val Gly Asn Thr Phe Val  
 130 135 140  
 tac ccg tta gcc ggc tat tca aaa aaa atc aaa 465  
 Tyr Pro Leu Ala Gly Tyr Ser Lys Lys Ile Lys  
 145 150 155

<210> 228  
 <211> 155  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 228

Met Thr Trp Gln Asn Val Ser Ile Ile Val Ser Tyr Pro Gln Thr Asp  
1 5 10 15

Ile Lys Arg Gly Ser Phe Met Asn Leu Lys Lys Leu Leu Gly Val Ala  
20 25 30

Thr Leu Ala Ser Val Phe Ala Leu Thr Ala Cys Asn Glu Glu Lys Lys  
35 40 45

Pro Glu Ala Ala Pro Ala Asp Lys Pro Ala Ala Glu Ala Pro Ala Thr  
50 55 60

Ile Lys Val Gly Val Met Ala Gly Pro Glu His Gln Val Ala Glu Ile  
65 70 75 80

Ala Ala Lys Val Ala Lys Glu Lys Tyr Asn Leu Asp Val Glu Tyr Val  
85 90 95

Leu Phe Asn Asp Tyr Ala Leu Pro Asn Thr Ala Val Ser Lys Gly Asp  
100 105 110

Leu Asp Val Asn Ala Met Gln His Lys Pro Tyr Leu Asp Lys Asp Ser  
115 120 125

Gln Ala Lys Gly Leu Asn Asn Leu Val Ile Val Gly Asn Thr Phe Val  
130 135 140

Tyr Pro Leu Ala Gly Tyr Ser Lys Lys Ile Lys  
145 150 155

<210> 229  
<211> 1008  
<212> DNA  
<213> Actinobacillus actinomycetemcomitans

<220>  
<221> CDS  
<222> (1)..(1008)

<400> 229  
atg atg gaa ctc gcc tat ttg caa aaa acg ccg cca aaa cag acc gca 48  
Met Met Glu Leu Ala Tyr Leu Gln Lys Thr Pro Pro Lys Gln Thr Ala  
1 5 10 15

ctt tta aaa gcg gaa tgc gcg gat ttt gtc gtc aaa gag caa ctg ggc 96  
Leu Leu Lys Ala Glu Cys Ala Asp Phe Val Val Lys Glu Gln Leu Gly



ccg ctt atc ggc gaa gag gac aaa agt gcg gtg gat ttt gag aat gaa 816  
Pro Leu Ile Gly Glu Glu Asp Lys Ser Ala Val Asp Phe Glu Asn Glu  
260 265 270

att ttt gtc gcg cac caa gcc ttg ttc cat ttg atg cgg caa gaa cgc 864  
Ile Phe Val Ala His Gln Ala Leu Phe His Leu Met Arg Gln Glu Arg  
275 280 285

gtg aaa gcc gcc cgc cgt ccg att tta atg cag gcg caa cag ttt caa 912  
Val Lys Ala Ala Arg Arg Pro Ile Leu Met Gln Ala Gln Gln Phe Gln  
290 295 300

tgg caa ttt gaa ccg aac ggt ttg cgc ctt aaa ttt tat ttg ccg gca 960  
Trp Gln Phe Glu Pro Asn Gly Leu Arg Leu Lys Phe Tyr Leu Pro Ala  
305 310 315 320

ggc agt tac gcc acg gcg ttg gta cgc gag ctg gtg aat gtt gaa aac 1008  
Gly Ser Tyr Ala Thr Ala Leu Val Arg Glu Leu Val Asn Val Glu Asn  
325 330 335

<210> 230

<211> 336

<212> PRT

<213> Actinobacillus actinomycetemcomitans

<400> 230

Met Met Glu Leu Ala Tyr Leu Gln Lys Thr Pro Pro Lys Gln Thr Ala  
1 5 10 15

Leu Leu Lys Ala Glu Cys Ala Asp Phe Val Val Lys Glu Gln Leu Gly  
20 25 30

Tyr Asp Met Ser Gly Asp Gly Glu Phe Val Ala Val Lys Ile Arg Lys  
35 40 45

Thr Asp Cys Asn Thr Leu Phe Val Gly Glu Gln Leu Ala Lys Phe Ala  
50 55 60

Gly Ile Ser Ala Arg Asn Met Ser Tyr Ala Gly Leu Lys Asp Arg Lys  
65 70 75 80

Ala Val Thr Glu Gln Trp Phe Ser Leu Gln Met Pro Gly Gln Pro Thr  
85 90 95

Pro Asp Phe Ser Gln Phe His Leu Asp Gly Val Asp Ile Leu Glu Val  
100 105 110

Thr Arg His Gln Arg Lys Ile Arg Ile Gly Ser Leu Gln Gly Asn His  
115 120 125

Phe Glu Ile Leu Leu Arg His Ala Glu Glu Thr Asp Glu Leu Lys Val  
130 135 140

Arg Leu Asp Phe Leu Ala Lys Asn Gly Phe Pro Asn Tyr Phe Thr Glu  
145 150 155 160

Gln Arg Phe Gly Arg Asp Gly Asn Asn Leu Thr Gln Ala Leu Arg Trp  
165 170 175

Ala Ala Gly Glu Ile Lys Val Lys Asp Arg Asn Lys Arg Ser Phe Tyr  
180 185 190

Ile Ser Ala Ala Arg Ser Glu Ile Phe Asn Leu Ile Val Ala Lys Arg  
195 200 205

Ile Glu Leu Ser Leu Ala Gln Gln Val Leu Asn Gly Asp Val Leu Gln  
210 215 220

Leu Asn Gly Ser His Ser Trp Phe Val Ala Asp Ala Ser Glu Asp Leu  
225 230 235 240

Thr Gln Leu Gln Gln Arg Leu Ala Gln Arg Asp Ile Leu Leu Thr Ala  
245 250 255

Pro Leu Ile Gly Glu Glu Asp Lys Ser Ala Val Asp Phe Glu Asn Glu  
260 265 270

Ile Phe Val Ala His Gln Ala Leu Phe His Leu Met Arg Gln Glu Arg  
275 280 285

Val Lys Ala Ala Arg Arg Pro Ile Leu Met Gln Ala Gln Gln Phe Gln  
290 295 300

Trp Gln Phe Glu Pro Asn Gly Leu Arg Leu Lys Phe Tyr Leu Pro Ala  
305 310 315 320

Gly Ser Tyr Ala Thr Ala Leu Val Arg Glu Leu Val Asn Val Glu Asn  
325 330 335

<210> 231

<211> 738  
 <212> DNA  
 <213> Actinobacillus actinomycetemcomitans

<220>  
 <221> CDS  
 <222> (1)..(738)

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<400> 231
atg aat att tta tta agt aac gat gac ggc att cac gcg ccg ggc att      48
Met Asn Ile Leu Leu Ser Asn Asp Asp Gly Ile His Ala Pro Gly Ile
1          5          10          15

cgt gtg atg gca gaa gca ttg cgt aag att gcc aat gtg acc atc gtc      96
Arg Val Met Ala Glu Ala Leu Arg Lys Ile Ala Asn Val Thr Ile Val
          20          25          30

gcg ccg gac agc aac cgc agc gcc gcc tcc agt tcc tta acc ttg gtg     144
Ala Pro Asp Ser Asn Arg Ser Ala Ala Ser Ser Ser Leu Thr Leu Val
          35          40          45

aag ccg ttg tat ccg tta cat ttg gaa agc ggt gat tat tgc gtc aac     192
Lys Pro Leu Tyr Pro Leu His Leu Glu Ser Gly Asp Tyr Cys Val Asn
          50          55          60

ggc acg ccg gcg gat tgc gtg cat att gcg ctg aac ggt ttt ctt tcc     240
Gly Thr Pro Ala Asp Cys Val His Ile Ala Leu Asn Gly Phe Leu Ser
65          70          75          80

ggg cgc atc gat ttg gtg att tcc ggc atc aac gcc ggg gcg aac ctg     288
Gly Arg Ile Asp Leu Val Ile Ser Gly Ile Asn Ala Gly Ala Asn Leu
          85          90          95

ggc gat gat gtg cta tat tcc ggc acg gtc gcg gca gca ttt gaa ggg     336
Gly Asp Asp Val Leu Tyr Ser Gly Thr Val Ala Ala Ala Phe Glu Gly
          100          105          110

cgt cat ctg ggc ttg ccg tct att gcg gta tcg ctc gat ggt cgt caa     384
Arg His Leu Gly Leu Pro Ser Ile Ala Val Ser Leu Asp Gly Arg Gln
          115          120          125

cat ttt gaa acg gcg gcg cgc gtg gta tgc gat ttg gtg ccg aaa tta     432
His Phe Glu Thr Ala Ala Arg Val Val Cys Asp Leu Val Pro Lys Leu
          130          135          140

cac gcc caa tta tta ggc aaa cac gaa att ctg aat att aac gtg ccc     480
His Ala Gln Leu Leu Gly Lys His Glu Ile Leu Asn Ile Asn Val Pro
145          150          155          160

gat gtg cct tac gaa gaa ctg aaa ggc att aaa gtg tgc cat ttg ggc     528
Asp Val Pro Tyr Glu Glu Leu Lys Gly Ile Lys Val Cys His Leu Gly
          165          170          175

tac cgt tct tcc gct tct gaa gtg att aaa cag caa agc ccg cgt ggc     576
Tyr Arg Ser Ser Ala Ser Glu Val Ile Lys Gln Gln Ser Pro Arg Gly
          180          185          190

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gaa gac atg tat tgg atc ggg ctc agc ggc ttg ccg gaa tat gaa agc	624
Glu Asp Met Tyr Trp Ile Gly Leu Ser Gly Leu Pro Glu Tyr Glu Ser	
195 200 205	
gaa ggc acc gat ttc cac gcg gtg aaa aac ggc tat gtt tcc att acg	672
Glu Gly Thr Asp Phe His Ala Val Lys Asn Gly Tyr Val Ser Ile Thr	
210 215 220	
ccg att cag gtg gac atg acc gcg cac cac tca atc aac gct tta caa	720
Pro Ile Gln Val Asp Met Thr Ala His His Ser Ile Asn Ala Leu Gln	
225 230 235 240	
cgt tgg tta gaa agt gaa	738
Arg Trp Leu Glu Ser Glu	
245	

<210> 232  
 <211> 246  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 232

Met Asn Ile Leu Leu Ser Asn Asp Asp Gly Ile His Ala Pro Gly Ile
1 5 10 15

Arg Val Met Ala Glu Ala Leu Arg Lys Ile Ala Asn Val Thr Ile Val
20 25 30

Ala Pro Asp Ser Asn Arg Ser Ala Ala Ser Ser Ser Leu Thr Leu Val
35 40 45

Lys Pro Leu Tyr Pro Leu His Leu Glu Ser Gly Asp Tyr Cys Val Asn
50 55 60

Gly Thr Pro Ala Asp Cys Val His Ile Ala Leu Asn Gly Phe Leu Ser
65 70 75 80

Gly Arg Ile Asp Leu Val Ile Ser Gly Ile Asn Ala Gly Ala Asn Leu
85 90 95

Gly Asp Asp Val Leu Tyr Ser Gly Thr Val Ala Ala Ala Phe Glu Gly
100 105 110

Arg His Leu Gly Leu Pro Ser Ile Ala Val Ser Leu Asp Gly Arg Gln
115 120 125

His Phe Glu Thr Ala Ala Arg Val Val Cys Asp Leu Val Pro Lys Leu
-----------------------------------------------------------------

130

135

140

His Ala Gln Leu Leu Gly Lys His Glu Ile Leu Asn Ile Asn Val Pro  
 145 150 155 160

Asp Val Pro Tyr Glu Glu Leu Lys Gly Ile Lys Val Cys His Leu Gly  
 165 170 175

Tyr Arg Ser Ser Ala Ser Glu Val Ile Lys Gln Gln Ser Pro Arg Gly  
 180 185 190

Glu Asp Met Tyr Trp Ile Gly Leu Ser Gly Leu Pro Glu Tyr Glu Ser  
 195 200 205

Glu Gly Thr Asp Phe His Ala Val Lys Asn Gly Tyr Val Ser Ile Thr  
 210 215 220

Pro Ile Gln Val Asp Met Thr Ala His His Ser Ile Asn Ala Leu Gln  
 225 230 235 240

Arg Trp Leu Glu Ser Glu  
 245

<210> 233

<211> 426

<212> DNA

<213> Actinobacillus actinomycetemcomitans

<220>

<221> CDS

<222> (1)..(426)

<400> 233

gat ctg ccg ttg gcg aac cct tac gaa atg ctg atc ctc gcg tcc atc 48  
 Asp Leu Pro Leu Ala Asn Pro Tyr Glu Met Leu Ile Leu Ala Ser Ile  
 1 5 10 15

gtg gaa aaa gaa acc ggc att gct gca gaa cgc cca caa gtg gcg tcg 96  
 Val Glu Lys Glu Thr Gly Ile Ala Ala Glu Arg Pro Gln Val Ala Ser  
 20 25 30

gta ttc att aat cgg tta aaa gcc aaa atg aag ctg caa acc gat ccg 144  
 Val Phe Ile Asn Arg Leu Lys Ala Lys Met Lys Leu Gln Thr Asp Pro  
 35 40 45

acc gtc att tac ggc atg ggc gac gac tac aac ggc aat att cgc aaa 192  
 Thr Val Ile Tyr Gly Met Gly Asp Asp Tyr Asn Gly Asn Ile Arg Lys  
 50 55 60



aaa gat ttg gaa acg cca acg cct tat aac acc tat gtg att gac ggc 240  
 Lys Asp Leu Glu Thr Pro Thr Pro Tyr Asn Thr Tyr Val Ile Asp Gly  
 65 70 75 80

ttg ccg ccg aca ccg att gcg atg ccg agt gaa gag gcg tta cag gcg 288  
 Leu Pro Pro Thr Pro Ile Ala Met Pro Ser Glu Glu Ala Leu Gln Ala  
 85 90 95

gtg gca cat ccg gcg caa acg gcg ttt tat tat ttc gtg gca gac ggc 336  
 Val Ala His Pro Ala Gln Thr Ala Phe Tyr Tyr Phe Val Ala Asp Gly  
 100 105 110

acg ggg gga cac aaa ttc agt cgt aat tta aac gaa cat aac aaa gcg 384  
 Thr Gly Gly His Lys Phe Ser Arg Asn Leu Asn Glu His Asn Lys Ala  
 115 120 125

gtg cag caa tat ttg cgc tgg tac cgc gaa caa aac gga aaa 426  
 Val Gln Gln Tyr Leu Arg Trp Tyr Arg Glu Gln Asn Gly Lys  
 130 135 140

<210> 234  
 <211> 142  
 <212> PRT  
 <213> Actinobacillus actinomycetemcomitans

<400> 234

Asp Leu Pro Leu Ala Asn Pro Tyr Glu Met Leu Ile Leu Ala Ser Ile  
 1 5 10 15

Val Glu Lys Glu Thr Gly Ile Ala Ala Glu Arg Pro Gln Val Ala Ser  
 20 25 30

Val Phe Ile Asn Arg Leu Lys Ala Lys Met Lys Leu Gln Thr Asp Pro  
 35 40 45

Thr Val Ile Tyr Gly Met Gly Asp Asp Tyr Asn Gly Asn Ile Arg Lys  
 50 55 60

Lys Asp Leu Glu Thr Pro Thr Pro Tyr Asn Thr Tyr Val Ile Asp Gly  
 65 70 75 80

Leu Pro Pro Thr Pro Ile Ala Met Pro Ser Glu Glu Ala Leu Gln Ala  
 85 90 95

Val Ala His Pro Ala Gln Thr Ala Phe Tyr Tyr Phe Val Ala Asp Gly  
 100 105 110

Thr Gly Gly His Lys Phe Ser Arg Asn Leu Asn Glu His Asn Lys Ala

115

120

125

Val	Gln	Gln	Tyr	Leu	Arg	Trp	Tyr	Arg	Glu	Gln	Asn	Gly	Lys
130						135					140		